INFLUENCE OF PARENTING STYLE AND ENVIRONMENT ON PERCEPTION OF PICKY EATING BEHAVIORS IN TODDLERS

BY

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THESIS

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ABSTRACT

A common problem parents experience with their toddlers during mealtime is picky eating. While no consistent definition exists within research, a picky eater typically consumes a limited variety of foods, avoids familiar foods, rejects new foods, and eats the same foods repeatedly. Many factors influence the development of picky behaviors including parents, who play a crucial role in their child's dietary preferences through what they serve and how they feed their child. Approaches towards child feeding differ among parenting styles and may positively or negatively affect the development of picky eating. The purpose of this research was to further elucidate the relationship that exists between parents and picky eaters. There were three objectives: 1) measure the relationship among parenting styles, parent mealtime strategies, and picky eating in toddlers, 2) objectively categorize picky eaters through observations in a childcare mealtime setting, and 3) assess whether variations in environment alter child mealtime behaviors. Fulfillment of these objectives was achieved through multiple phases of research. First, the availability of 140 foods in the home was compared to the dietary variety of children considered to be a picky eater (PE, n=83) and a non-picky eater (NPE, n=88). Parents of PEs served similar foods as parents of NPEs, indicating that more factors besides food availability influence pickiness in children. Exploratory qualitative research was then conducted to assess parental perception of picky eating according to parenting style. Eight focus groups were conducted with parents who had children age 2-5 years: four authoritative (n=26), two authoritarian (n=12), and two permissive (n=14). The three parenting styles had differing approaches to mealtime and authoritative parents stood out as promoting feeding strategies that encourage positive behavior. Authoritarian and permissive parents did not mention positive strategies, such as modeling proper intake, but did discuss using the negative strategy of rewards

for eating. These findings were further confirmed through parent surveys about mealtime and parenting style. Parents (n=525) of toddlers aged 2-5 completed the Mealtime Assessment Survey (MAS) about the frequency of child mealtime behaviors and parent mealtime strategies, as well as the Parenting Styles and Dimensions Questionnaire (PSDQ) to assess parenting style. Spearman's correlation analysis revealed that authoritative parenting was positively correlated to NPE child behaviors and strategies that promote good eating patterns in children. In contrast, authoritarian and permissive parenting styles were positively correlated to PE child behaviors and strategies that may have harmful effects on child mealtime behaviors. The Toddler Mealtime Behavior Study (TMBS) was the final phase of research and was conducted using 35 parent-toddler pairs. Parents completed the MAS and PSDQ and results showing similar correlations between parenting style and child mealtime behaviors seen with the larger data set. Teachers (n=15) who worked with the children in the childcare setting also completed a modified version of the MAS and their results were compared to the parent survey. Parents reported a higher prevalence of behaviors associated with picky eating at home than did childcare teachers, indicating a shift in child mealtime behavior between environments. Additionally in the TMBS, children were observed during mealtimes and objectively classified as PE or NPE based on their dietary variety and behaviors. Researcher observations were compared to parents' and teachers' PE and NPE assignments and there was no apparent trend in the classifications. When measuring pickiness in toddlers, it is difficult to separate picky eating, non-food related mealtime problems, and general behavior challenges. Also, the perceptions of PE status fluctuate based on parenting and environmental influences. Further work is needed in observing parent and child interactions in the home to assess the possible benefits of authoritative parenting strategies on mealtime and confirm environmental differences in child behavior.

Dedicated to my wonderful parents and sister for their never-ending love, support, and encouragement—and teaching me that I can succeed at whatever I put my mind to.

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CHAPTER 1
Introduction

1.1 Motivation

Parents and caregivers are primary influencers of child development. This is especially true in the formation of child food preferences and mealtime behaviors. While genetics, environment, and peers all shape the dietary patterns of infants and toddlers, parents can be a driving factor behind food acceptance (Birch, 1980; Birch, Zimmerman, & Hind, 1980; Birch, 1999; Faith, 2005; Savage, Fisher, & Birch, 2007). Parents serve as providers and role models for their children through deciding what food to buy, prepare, and serve during mealtimes (Cathey & Gaylord, 2004; Savage et al., 2007).

The way in which parents feed their child can also affect food preferences. Mealtime strategies such as encouragement to try novel foods, repeated exposure to both familiar and unfamiliar foods, and parent modeling of proper intake can positively impact a child's long term acceptance of a wider dietary variety (Birch & Marlin, 1982; Cullen et al., 2001; Fisher, Mitchell, Wright, & Birch, 2002; Galloway, Fiorito, Lee, & Birch, 2005; Patrick & Nicklas, 2005). However, when parents pressure their child to eat, restrict foods, use rewards for eating, and exert too much control over mealtimes, they can negatively influence child behaviors and may discourage the liking of new foods (Birch, Birch, Marlin, & Kramer, 1982; Birch, McPhee, Shoba, Steinber, & Krehbiel, 1987a; Fisher & Birch, 2000; Galloway et al., 2005). Parents who experience picky eating behaviors are constantly looking for solutions as to how to overcome this struggle and get their child to eat a wider variety of foods (Cathey & Gaylord, 2004).

Previous research indicated that parenting style influences the methods parents use to feed their child. Three major parenting styles have been explored in the context of mealtime: authoritative, authoritarian, and permissive. Authoritative parents set boundaries and

expectations for their child, while using high levels of warmth (Baumrind, 1966). In child feeding, this style of parenting is associated with the positive mealtime strategies of encouragement, modeling, and providing a wide variety of foods in the home (Hubbs-Tait, Kennedy, Page, Topham, & Harrist, 2008; Hughes, Power, Fisher, Mueller, & Nicklas, 2005; Iannotti, O'Brien, & Spillman, 1994; Patrick, Nicklas, Hughes, & Morales, 2005). Authoritarian parents also have high levels of expectations for their child, but they exhibit these with lower levels of warmth (Baumrind, 1966). This parenting style has been connected to using negative mealtime strategies such as pressure, control, and restriction (Hubbs-Tait et al., 2008; Patrick et al., 2005; Wardle, Carnell, & Cooke, 2005). Permissive parents set fewer boundaries for their child, but provide a high level of warmth (Baumrind, 1966). During mealtime, they are more lenient and have been associated with providing rewards for eating (Patrick & Nicklas, 2005; Rhee, Lumeng, Appugliese, Kaciroti, & Bradley, 2006).

Parents may alter their style of parenting based on the context of the situation according to Costanzo and Woody's domain-specific parenting style (1985). During feeding, parents may alter how they interact with their child in order to best promote feeding, but these caregiver feeding styles are still characterized as authoritative, authoritarian, and permissive (Birch & Fisher, 1995; Patrick et al., 2005; Savage et al., 2007). It was confirmed by Hubbs-Tait and others (2008) that caregiver feeding styles predict general parenting styles showing the importance of overall parent behaviors during mealtime.

Assessing the impact parents have on child mealtime is crucial in furthering our understanding of picky eating and developing effective strategies for parents to employ. As many as 50% of parents report experiencing picky eating behaviors by the time their child is two years old, which creates concerns and frustrations in regards to child eating habits (Carruth,

Ziegler, Gordon, & Barr, 2004; Reed, 1996). The foundation for describing a picky eater is their consumption of a lower dietary variety. Picky eaters have specific food preferences and will frequently avoid both new and familiar foods (Carruth et al., 1998; Galloway, Lee, & Birch, 2003; Jacobi, Schmitz, & Agras, 2008). Additionally, Mayeaux-Boquin (2010) found an association between picky eating and mealtime difficulties, such as refusing to come to the table, getting upset about the food served, needing a specific food presentation, and taking a long time to finish eating.

Despite these known behaviors associated with picky eating, the definition is not completely understood and there is not a standardized method to measure whether a child is picky or non-picky within research (Dovey, Staples, Gibson, & Halford, 2008; Kauer, Rozin, & Pelchat, 2002). Parents are frequently the source of information in research regarding picky eating behaviors (Carruth et al., 2004; Mascola, Bryson, & Agras, 2010; Mayeaux-Boquin, 2010); however, these perceptions may be subjective. There is only one study to our knowledge that directly observed children eating in order to assess picky eating, but it was in a controlled laboratory setting (Jacobi et al., 2008). Currently, there are no studies using researcher observations in a child's natural eating environment to categorize picky eaters.

Within the literature, established relationships exist between parent mealtime strategies and child's diet, as well as parenting styles and parent mealtime strategies. Where research is lacking is the connection between parenting styles and child mealtime behaviors. Past findings indicate that the various strategies used by authoritative, authoritarian, and permissive parents will have differing impacts on child mealtime; however, it is unknown whether there is a relationship between parenting style and picky eating.

Another element missing from picky eating research is the influence of different environments on child mealtime behavior. Food intake is partially a learned behavior where children observe consumption and then imitate the actions of those around them (Birch & Fisher, 1998; Nicklas et al., 2001). Therefore, toddlers who attend daycare or preschool are learning not only from their parents, but also from teachers and peers. The impact of differing environments has not been accounted for in previous picky eating research.

1.2 Objectives

The goal of this work was to further elucidate the relationship that exists between parents and picky eaters. In order to assist parents in fostering healthy independent eaters, we need to understand the factors behind what creates a picky eater. Our overall research objectives to achieve this goal were to: 1) measure the relationship among parenting styles, parent mealtime strategies, and picky eating in toddlers, 2) objectively categorize picky eaters through observations in a natural mealtime setting, and 3) assess whether variations in environment alter child mealtime behaviors.

In order to fulfill these objectives, multiple stages of research were carried out. First, continued analysis of our previous research was conducted to determine if there was a relationship between food availability in the home and picky eating in children (Chapter 3). From there, we were able to further explore the impact of parenting style on the development of picky eaters. A series of focus groups were conducted to assess the differences in parental perceptions of picky eating based on parenting style (Chapter 4). The correlation between parenting style and picky eating was further explored through a series of surveys about child mealtime behaviors and parent mealtime strategies (Chapter 5). Finally, children were

objectively observed by researchers at mealtime to assess pickiness. These categorizations of picky and non-picky eaters were compared to parents' and teachers' perceptions about the same children's mealtime behaviors (Chapter 6). The results from this entire investigation will provide insight into how parents and environment impact picky eating and what style of parenting is the most beneficial in promoting healthy eating patterns in children.

CHAPTER 2
Literature Review

2.1 Defining Mealtime Problems

Picky Eating

During infancy and toddlerhood, children are exploring their dietary likes and dislikes, which will set the tone for lifelong food preferences. It is also a critical growth stage for children, making optimal nutrition essential for physical and cognitive growth and development (Savage et al., 2007). However, some parents experience difficulty in promoting healthy eating habits due to the widespread prevalence of the feeding problem known as picky eating. As many as 50% of parents report their child as a picky eater by the time they reach 2 years of age (Carruth et al., 2004). Pickiness often presents itself at a young age as children search for autonomy during their transition into the toddler years (Crockenberg & Litman, 1990; Kuczynski, Kochanska, Radke-Yarrow, & Girnius-Brown, 1987); therefore a struggle between parents and children for feeding control begins that can result in mealtime difficulties (Cathey & Gaylord, 2004). In most cases, the behaviors parents associate with picky eating peak in childhood and subside overtime, but some children continue to display picky eating characteristics into their adolescent years and even adulthood (Mascola et al., 2010).

There is no single operational definition utilized by researchers for what constitutes a "picky eater" (Dovey et al., 2008); however there are similar themes that have emerged. The basis of defining picky eating lies in the rejection of new or familiar foods, which results in lower dietary variety. In general, young children often do not meet the necessary dietary requirements and are lacking significantly in vegetable intake (Dennison, Rockwell, & Baker, 1998; Fox, Pac, Devaney, & Jankowski, 2004; Stanek, Abbott, & Cramer, 1990). When comparing picky and non-picky eaters, the gap between recommended and actual consumption

widens with a greater avoidance of fruits, vegetables, protein sources, and mixed foods in children categorized as picky (Carruth et al., 1998; Carruth et al., 2004). The lower variety of foods consumed by picky eaters can lead to inadequate micronutrient intake including fiber, vitamin E, vitamin C and folate (Dovey et al. 2008; Dubois, Farmer, Girard, Peterson, & Tatone-Tokuda, 2007; Galloway et al., 2005). However, it is not conclusive whether pickiness directly affects long term growth and maturation (Ventura & Birch, 2008; Wright, Parkinson, Shipton, & Drewett, 2007).

Along with decreased dietary variety, picky eating is associated with a variety of other behaviors exhibited at mealtimes. Typically picky eaters have a narrow range of foods that they prefer to eat and require a precise preparation for the foods they are willing to eat (Jacobi et al., 2008). They are content eating the same foods repeatedly, avidly avoid trying unwanted foods, and may even omit entire food groups, such as vegetables, from their diet (Carruth et al., 1998, Mayeaux-Boquin, 2010). Additionally, some picky eaters show signs of physical sensory aversions to food such as gagging, caused by hypersensitivity. This is known as tactile defensiveness and is caused by both tastes and textures. Reactions that indicate sensory aversions can lead to a decrease in dietary variety, but may indicate a separate issue apart from picky eating (Smith, Roux, Naidoo, & Venter, 2005; Thomson et al., 2010).

Food Neophobia

One aspect of the picky eating definition is an unwillingness to try new foods, otherwise known as food neophobia. A review by Dovey et al. (2008) specifies that those who have food neophobia are not necessarily picky eaters, yet picky eaters can display characteristics of food neophobia. The difference is that picky eaters reject both novel and familiar foods, while food

neophobics are only wary of new foods. Children exhibiting food neophobia may reject a food by sight alone without actually tasting it, which is thought to be derived from an innate survival mechanism. Evolutionarily, in order to protect one's health, it was necessary to be cautious of new foods that could potentially be harmful (Pliner & Hobden, 1992). Rozin (1976) first described this defense as "the omnivore's dilemma", because it is necessary for omnivores to accept new foods in order to meet their nutritional needs, but also take the risk that some foods could be poisonous. In young children, food neophobia is associated with those who are not even interested in seeking out new foods to try (Nicklaus, Boggio, Chabanet, & Issanchou, 2005). Repeated contact with a novel food can assist in overcoming this fear, but it may require as 10 to 16 exposures to achieve this result (Rozin & Vollmecke, 1986). If food neophobia is not addressed in young children, it is likely that the issue will continue even as the child matures into adulthood (Marcontell, Laster, & Johnson, 2003).

General Feeding Problems

During mealtimes, there are other feeding problems that arise separately from picky eating and food neophobia. Parents report that along with refusing food, children can be found playing, dawdling, making a mess, drinking instead of eating, consuming low amounts of food, and showing indifference towards food in general. Anywhere from 20% to 49% of parents experience some kind of problems during mealtime, which leads parents to exert greater control over the meal (Hertzler, 1983; Pelchat & Pliner, 1986; Wright et al., 2007). While picky eating and food neophobia are based on dietary likes and dislikes, additional feeding problems may be the result of a child's natural development. For example, instances of playing and dawdling at the table could stem from a child's desire to play and explore their surroundings. Children see

play as a purposeful activity that serves as a means to learn about their environment and this desire cannot be suppressed during mealtime (Vygotskey, 1967; Yawkey & Silvern, 1977). Concerning the problems of low consumption and a lack of interest at meals, it may be that children are not hungry or they have already met their nutritional needs causing them to stop eating. Children need smaller portions of food than adults and are better at regulating their total caloric consumption based on their body's energy requirements. Asking children to eat when they are already full, or giving them too much food, can lead to overeating and alter the child's innate ability to self-regulate their intake (Birch & Deysher, 1986; Fisher, Liu, Birch, & Rolls, 2007).

Parent Concerns

Regardless of whether troubles arise from picky eating, food neophobia, feeding problems, or a combination of issues, as soon as parents experience a difficult mealtime behavior, they begin to worry about their child's nutritional status, growth and development. Parents become concerned about their child's total dietary intake and also want to ensure their child is consuming appropriate foods that promote a healthy lifestyle (Cullen, Baranowski, Rittenberry, & Olvera, 2000). When a feeding problem is perceived, parents begin monitoring dietary habits and employing methods to encourage feeding. However, the wrong approach could make problems worse and lead to greater struggle with the child, additional behavioral problems, and weight management issues (Carruth et al., 1998; Forthun 2008; May et al., 2007). The impact of parents on child feeding is further discussed in section 2.3 of this review.

2.2 Factors that Influence Picky Eating

The development of food preferences in infants and children occurs over time and is influenced by genetics, peers and siblings, and the child's surroundings (Birch, 1999; Cathey & Gaylord, 2004; Dovey et al., 2008; Savage et al., 2007). Our biological predispositions interact with environmental stimuli in what's known as the "Developmental Systems Theory" developed by Ford & Lerner (1992). This psychological theory explains the balance of nature, from human genes and physicality, with nurture, through social and cultural exposure. Birch (1999) applied the developmental system to the formation of food preferences in children. Infants are born with specific likes and dislikes regarding taste or texture, which are then further shaped by external environmental influences. Picky eating behaviors appear to stem from different combinations of these formative factors beginning with their earliest dietary experiences (Cathey & Gaylord, 2004; Dovey et al., 2008).

Genetics of Food Preferences

Innate preferences

Humans have certain predispositions towards the five basic tastes: sweet, salty, bitter, sour, and umami (Beauchamp & Mennella, 2009; Rosenstein & Oster, 1988). Desor, Maller, and Turner (1973) found that postpartum infants had positive facial reactions to sugar solutions and the solutions with a higher sweetness concentration had the highest consumption and sucking rate, demonstrating a greater preference. Human evolution brought about this innate liking of sweetness because sweet foods were often safe to eat and provided ample energy (Rozin & Vollmecke, 1986). Despite the initial preference towards sweeter solutions, repeated exposure to foods can modify an infant's liking over time. According to Beauchamp and Moran (1982),

infants who were fed sugar water during the first six months of life continued to consume greater amounts of the sweet solution, while infants who were not fed sugar water over the first six months showed a decline in preference. This confirmed that an adaptation in taste preference can occur based on prior contact and experience with foods. Along with sweet, salty and umami tastes are also accepted early on by children. Cowart and Beauchamp (1986) found that children aged 3-6 preferred high levels of salt within foods, as indicated by the increased consumption of salted soups versus plain soup. Additionally, Beauchamp & Pearson (1991) demonstrated that infants preferred soup with an umami taste, achieved through the addition of monosodium glutamate (MSG), over plain soup without MSG.

Bitter taste is innately disliked and rejected by humans. Before infants have a chance to learn flavor preferences they show negative facial expressions when given bitter solutions (Birch, 1999). This response developed from a survival mechanism to avoid bitter plants, which were often poisonous (Glendinning, 1994). There is also a genetic difference in tasting bitterness as measured by the ability to detect the bitter compound 6-n-propylthiouracil (PROP). Gene expression determines the sensitivity with which one perceives bitter, with non-tasters (recessive) having a greater threshold for bitterness and tasters (dominant) showing a stronger dislike for bitter foods such as vegetables and coffee (Drewnowski & Gomez-Carneros, 2000). In preschool aged children, PROP tasters are less likely to consume bitter vegetables, especially cruciferous varieties, when compared to non-tasters (Bell & Tepper, 2006; Keller, Steinman, Nurse, & Tepper, 2002). This sensitivity to bitter could play a role in whether or not pickiness develops because people who are PROP tasters report being less adventurous when it comes to trying new foods (Ullrich, Touger-Decker, O'Sullivan-Maillet, & Tepper, 2004). However, over time a liking for the bitter compounds found in foods like vegetables and caffeine beverages can

be learned through exposure and consumption (Beauchamp & Mennella, 2009). In addition to rejecting bitter tastes, humans are not prone to like sour tastes either; however, this has not been as extensively studied (Birch, 1999).

Heritability

Researchers agree that there is a heritable factor in food preferences passed through families, but it is still uncertain how much of a role it plays (Faith, Scanlon, Birch, Francis, & Sherry, 2004). A review by Reed, Bachmanov, Beauchamp, and Tordoff (1997) emphasized the difficulty of removing cultural and environmental factors when exploring the genetics of dietary choices. Despite this, findings did conclude that there is a greater heritability in preferences for macronutrients, such as carbohydrates and fats, than what has been seen in individual food items. Even though research has shown a slightly stronger connection for food preferences among genetically-related family members, children have also shown similarities in dietary preferences to non-genetically related family members as well (Birch, 1999; Faith, 2005; Reed et al., 1997). Pliner and Pelchat (1986) found a resemblance in liking within families; however, due to the age difference, the preferences of young children were closer to the consumption of their siblings than to their parents. Tastes change with age, which may explain any variation seen between parent and child food preferences. A constant difficulty in assessing the heritability of dietary choices is isolating genetic components for analysis (Faith, 2005).

As with food preferences, food avoidance may be influenced by both genetics and environment. Pliner (1994) uncovered similar levels of food neophobia between parents and their children, while Cooke, Haworth, and Wardle (2007) showed heritability of food neophobia among twins. Yet, there is an undeniable environmental influence and the behaviors of parents,

siblings, and peers can impact whether or not a child tries new foods. As discussed later, parental modeling, food availability, and parent-child interactions also impact dietary acceptance (Nicklas et al., 2001; Patrick et al., 2005; Savage et al., 2007). Genetics is definitely an influential factor regarding food preferences but its overall contribution to the complex interactions that shape a child's preferences remains unknown.

Child development

Along with the dual influences of genetics and environment, "picky eating" behaviors displayed by many toddlers may stem from a normal stage of human development. Johnson (2002) highlighted the role of developmental ontogeny in food neophobia observed by many parents when their child is around the age of two. As an evolutionary mechanism, children are naturally skeptical of new foods in order to avoid anything harmful (Dovey et al., 2008). Therefore, it is the job of the parent and other caregivers to demonstrate trying new foods and making children comfortable with a wide dietary variety (Johnson, 2002). Around the same time that picky eating emerges, children are developing and learning how to do things for themselves. This search for autonomy often leads to children exhibiting noncompliance with parental requests (Crockenberg & Litman, 1990; Kuczynski et al., 1987). In some cases, rejection of foods may be related to the child seeking control rather than an actual dislike of the meal served. A review by Cathey and Gaylord (2004) emphasized the need to give some control of mealtime decisions to the child to alleviate this struggle between parents and children. Recommendations included providing choices at the meal, but allowing the child to decide what and how much of each food to eat.

Influence of other children

Peers

From infancy, humans learn from the actions of those around them. The strong influence of peers has been demonstrated across childhood from infancy to adolescence. Along with parents, peers serve as a model for behavior and set the norms for social situations (Biddle, Bank, & Marlin 1980; Hanna & Meltzoff, 1993). Toddlerhood is a critical time as children develop their dietary preferences and those around them at home, daycare, and school have a major impact. The theory of Social Suggestion was first examined in the context of food choices by Duncker (1938) who tested a child's preference for a series of foods before and after watching another child perform the same task. His results showed a strong trend for children to choose a food that was initially less preferred if another child made the same choice, especially in the case of younger children watching older peers. Birch and others (1980) replicated these results in a similar study and concluded that social influence can lead preschoolers to consume a non-preferred food even over a preferred food, if children were eating it as well.

A few studies have focused primarily on the impact of peers on fruit and vegetable consumption, since this is often below recommended levels in children, especially picky eaters (Carruth et al., 2004; Dennison et al., 1998). Qualitative work conducted by Cullen, and others (2000) with 4-6 grade children found that negative comments made by other students was mentioned as a reason for not consuming fruits and vegetables. Further work with the same population revealed that young adolescents do not believe others their age are eating fruits and vegetables (Cullen et al., 2001). Comments from peers that either encourage consumption or prompt the rejection of a food can also impact behavior in preschoolers (Iannotti et al., 1994). In addition to basing their consumption of specific foods off the opinions of others, toddlers take

visual cues of what to eat from those around them. After seeing peers model vegetable consumption, they imitated these actions, even if the vegetable was originally disliked (Birch et al., 1980). This persuasive effect of peer modeling on a child's willingness to try foods, including vegetables, could lead to a transformation in picky eaters' dietary variety.

Siblings

Although there is a level of influence shared by peers and siblings, differences are present in how children treat their peers versus how they treat their brother or sister. Older siblings play a unique role because they provide more guidance and serve as a teacher for younger children (Azmita & Hesser, 1993). In the context of mealtimes, siblings show similarities among their food preferences. Pliner (1986) found that when comparing the diet of young children to their parents and siblings, there was a stronger correlation seen between the target child and their older sibling. However, Skinner et al. (1998) showed that the influence of parents and siblings was the same on a toddler's diet. Regardless of which family member has the greater impact, it is apparent that they all play a significant part in shaping the food choices of young children.

2.3 Parent influence

Despite the influence of genetics, peers, and child development on picky eating, parents play one of the most crucial roles when it comes to increasing a child's food preferences. As the primary providers for their child, parents decide what foods are present in the home, what foods are served to the child, and they set the guidelines for family mealtime (Cathey & Gaylord, 2004; Dovey et al., 2008; Savage et al., 2007). The home environment serves as the place where children have their first experiences with food and where they ultimately build the foundation for

their lifelong eating habits (Savage et al., 2007). Often, parents employ a variety of methods or "strategies" to encourage consumption of new foods while discouraging unhealthy foods (Moore, Tapper, & Murphy, 2007); however, even though parents' intentions for using strategies are good, the outcome may not be what parents expect (Wardle, 1995). Some parent mealtime strategies create a positive environment for their child, while others may have a negative effect on their child's behaviors. Understanding the difference between these positive and negative strategies could be a key part of promoting healthy eating habits that follow children into adolescence and adulthood (Birch & Fisher, 1995; Cathey & Gaylord, 2004; de Bourdeaudhuij, 1997; Nicklaus et al., 2005; Savage et al, 2007).

Positive parental strategies

Food Availability

One strategy parents can utilize to improve their child's dietary diversity is to increase the variety of foods available in the home. In toddlers, mere exposure to a food can alter liking and increase the consumption of that food (Birch & Marlin, 1982; Zajonc, 1968). This is especially true when exposure is coupled with parental encouragement to taste the novel food (Birch & Marlin, 1982; Cooke, 2007). Repeated contact with a food, upwards of 10 to 16 times, can change acceptance and shift a child's opinion from dislike to like (Birch & Marlin, 1982, Birch, McPhee, Shoba, Pirok, & Steinberg, 1987; Savage et al., 2007). Also, having new foods around the kitchen increases a child's motivation and self-efficacy to taste something that is unfamiliar during snacks and meals (Domel et al., 1996). Foods that are often avoided by picky eaters, such as fruits and vegetables (Carruth et al., 1998; Mayeaux-Boquin 2010), are consumed in greater quantities following constant exposure by parents (Cullen et al., 2003; Hearn et al., 1998; Kratt,

Reynolds, & Shewchuk, 2000; Nicklas et al., 2001; Wardle, Herrera, Cooke, & Gibson, 2003). Vegetables are the most rejected foods due to toddlers' innate aversion to bitter and it can take time to learn the acceptance of this taste (Birch, 1999; Fox et al., 2004; Mayeaux-Boquin, 2010, Yeomans, 2006). Yet, when parents repeatedly expose their child to an unfamiliar or disliked vegetable, it assists the child in overcoming refusal. Zeinstra, Koelen, Kok, and de Graff (2009) took this a step further and demonstrated that if plain, raw vegetables are continually rejected, then mixing the vegetables with other foods to dilute the bitterness can lead to acceptance. It is important to note that there are differences between visual and taste exposure as Birch et al. (1987b) pointed out. Asking a child to taste a food in addition to offering it to the child may be more effective than simply offering the food without requiring a bite; however, as described later, there is a fine line between the benefits of encouraging a child to taste something new and the negative effect of forcing a child to eat.

Parent Modeling

Another beneficial strategy used by parents is modeling of food intake. As described by Bandura and Rosenthal (1978), parental modeling provides a form of observational learning, wherein the child observes the parent and imitates the resulting behavior. Much of the development of food preferences in early life comes from watching others eat and becoming familiar enough with a food to have motivation to try it (Birch & Fisher, 1998; Nicklas et al., 2001; Savage et al., 2007). Modeling has been shown to be effective in overcoming neophobic behaviors in children. Hobden and Pliner (1995) found that "food adventurousness" was increased in those with both high and low levels of food neophobia after watching somebody else consume novel foods.

Multiple studies have shown that parental modeling is a possible factor in increasing children's fruit and vegetable consumption (Cullen et al., 2001; Fisher et al., 2002; Gross, Pollock, & Braun, 2010; Jones, Steer, Rogers, & Emmett, 2010). Cooke and others (2004) and Vereecken, Rovner, and Maes (2010) concluded that parent consumption of fruits and vegetables was the strongest predictor of their child's intake. This positive impact of parental modeling on child consumption has been shown in minority populations as well. Tibbs et al. (2001) and Stolley and Fitzgiboon (2007) found that African-American children ate diets lower in fat and higher in fruits and vegetables when their parents consumed this type of diet as well. Similar results were found in Hispanic American families, with children's intake of fruits and vegetables being highly correlated to their parents' intake (Fitzgibbon, Stolley, Avellone, Sugerman, & Chavez, 1996). Combining parental modeling with repeated food exposure may be even more successful in expanding a child's comfort level with new foods. According to Harper and Sanders (1975), children aged 14-48 months were more likely to accept a novel food when an adult, especially a parent, consumed the food compared to children who were only offered the food.

Negative parental strategies

Parents are in charge of feeding their children and setting the standards for future eating habits, but their efforts are not always successful (Savage et al., 2007; Scaglioni, Salvioni, & Galimberti, 2008). One issue that parents face is that infants and toddlers are innately drawn to sweet and salty foods, but are apprehensive of foods that are bitter and sour (Birch, 1999). This creates difficulties in promoting healthy eating, since vegetables are inherently more bitter than other foods, which ultimately affects preference (Dinehart, Hayes, Bartoshuk, Lanier, & Duffy,

2006). Therefore, children often over eat foods high in fat and sugar, while consuming insufficient amounts of necessary nutrients that come from fruits and vegetables (Fox et al., 2004; Munoz, Krebs-Smith, Ballard-Barbash, Cleveland, 1997). As a result, parents begin to take control over what their child eats and may set rules about eating healthy foods, while making "junk" food off limits or only for special occasions. However, the use of control, restriction, and rewards by parents in the context of child feeding can actually have a negative result and may promote the behaviors parents are trying to prevent (Birch & Fisher, 1998; Patrick & Nicklas, 2005; Scaglioni et al., 2008).

Control and pressure

Parental use of control and pressure over their child's intake has been consistently linked with negative results at mealtime (Patrick & Nicklas, 2005, Savage et al., 2007). Infants and children have an innate sense of self-regulation during feeding and are better able to balance consumption with their caloric needs than adults (Birch & Deysher, 1986); yet when parents exert control over mealtime, it disturbs a child's ability to perceive signals of satiety and can even increase the child's dislike of certain foods. Birch et al. (1987a) confirmed the difference between internal and external cues humans have while eating, that was originally established by Weingarten (1983). The internal cues come from hunger and satiety, while the external cues are based on outside conditioning triggers that lead to feeding. An example of an external cue is when parents prompt their children to eat with phrases like "take one more bite" or "clean your plate". This strategy can override the child's feeling of fullness, causing them to consume more energy than they need (Orrell-Valente et al., 2007). Pressure to eat often arises when parents perceive their child as picky and aim to improve their acceptance of rejected foods; however, the

result is actually a decrease in child fruit and vegetable consumption (Fisher et al., 2002; Galloway et al., 2005).

Research has shown that parents' use of pressure or control during meals often stems from concerns related to weight, whether it is the child's weight or the parent's weight. Francis, Hofer, and Birch (2001) found that when mothers perceive their daughter to be thin or underweight, they use more force to encourage them to eat more. However, this may be counterproductive as Galloway, Fiorito, Francis, and Birch (2006) showed that children aged 3-5 years who had parents that reported using pressure actually had lower body mass index (BMI) levels; in this case, pressure was unsuccessful in promoting increased consumption as intended. Control over feeding also occurs more when parents have had their own weight struggles and are concerned about their child becoming overweight (Birch & Fisher, 2000; Costanzo & Woody, 1985).

Restriction

Food restriction is another method parents use in controlling child feeding that has unintended results. Psychologically, people simplify their nutritional beliefs and dichotomize foods into either "good" or "bad" (Rozin, Ashmore, Markwith, 1996). This can lead those who are weight conscious to restrict "bad" foods in an attempt for diet regulation; however, this deprivation approach can lead to overeating later (Wardle, 1990). In the case of children, constraints put on a food increases the attractiveness of that item and makes children want the "restricted" food even more (Lepper, Sagotsky, Dafoe, & Greene, 1982). When feeding a child at home, parents may try to use methods of restriction to reduce consumption of "bad" foods high in fat and sugar content. Fisher and Birch (1999a, 1999b) have extensively examined the

effects of food restriction on the toddler and child food intake. Their results showed that children direct more of their attention towards a food more when it is "forbidden" and will consume more of it once it is accessible. Even though restricting unhealthy foods may seem logical to parents as a way to foster healthy eating in their children, this strategy makes the unhealthy foods more appealing, leads to overeating when the restrictions are lifted, and creates negative emotions about food (Fisher & Birch, 2000; Rhee, 2008).

Rewards

Parents also use rewards as a mealtime strategy to encourage their child to eat. This method can come in the form of food rewards such as "you can have dessert if you eat your vegetables", or as non-food rewards such as "you can watch T.V. if you finish your dinner" (Birch et al., 1982; Moore, et al., 2007). The goal of using rewards is similar to that of control or food restriction: parents want to influence their child's attitudes about foods and promote healthy independent eaters (Birch, 1999). Initially this method works because children will consume the food that is required to gain the reward, but in the long-term, this strategy often leads children to dislike the food they are forced to eat. The required food is seen as a "means to an end" and becomes associated in the child's mind as something "bad" they have to eat in order to get something "good" (Birch et al., 1982; Birch, Marlin, & Rotter, 1984). Newman and Taylor (1992) demonstrated that this means-to-an-end phenomenon can alter food preferences. Children were given two snacks with one as the "means" to get the second "reward" snack. Even though they initially ranked the snacks as similar in liking, the score significantly diverged when the test was over with the "means" snack receiving a lower score. Therefore, when parents use a reward

to get their child to eat unwanted foods, such as vegetables, this can lead the child to dislike the vegetables even more (Rhee, 2008).

Strategies and picky eating

Parents are constantly conscious of their child's eating habits and when there are problems during mealtime, it raises their level of concern. This is especially true when parents perceive their child as a picky eater (Carruth et al., 1998, Reed, 1996). Having labeled their child as "picky" or as having feeding problems can lead parents to use a wider variety of mealtime strategies, including coercive techniques, due to more parent-child struggles at the table (Jacobi et al., 2008, Pelchat & Pliner, 1986; Sanders, Patel, le Grice, & Shepard, 1993). As Mayeaux-Boquin (2010) found, parents of picky eaters used significantly more strategies than parents of non-picky eaters, including using food as a reward or restricting certain foods as a consequence for not eating. A vicious cycle begins as parents of picky eaters work hard to promote proper eating, including fruit and vegetable consumption, which could be making the problem worse by decreasing their child's acceptance of new foods (Forthun, 2008; Patrick & Nicklas, 2005). Benton (2004) states that the parent-child feeding relationship is not necessarily causal, but that there is an influence of parent behavior on their child's actions. Parents of picky eaters become more frustrated and utilize more strategies (Carruth et al., 1998; Reed, 1996), but the question of what leads parents to have a lower tolerance for mealtime struggles remains unanswered. The answer could be due to different parenting styles and how these styles influence approaches parents use while feeding their children.

2.4 Parenting Styles

General Parenting Styles

The basis of psychological theory about parenting styles was developed by Diana Baumrind in the late 60's and early 70's (1966, 1971).. Originally her theory highlighted three types of parental control: authoritative, authoritarian and permissive (Baumrind, 1966, 1971). Later, the neglectful style was added by Maccoby and Martin (1983), creating the four main parenting styles recognized today. According to Baumrind's theory, authoritative parenting is the ideal style through its balance between parental control and allowing the child to retain some independence. The authoritative parent sets boundaries and standards, yet does not bind the child by restrictions and account for their child's individuality. Authoritarian parenting is defined by stricter rules of obedience and parental control. Parents exhibiting this style maintain that their word is right and they restrict their child's autonomy. The permissive parenting style involves the parent giving control to the child. A permissive parent often gives-in to the child's desires and does not create an expectation for responsibility on the part of the child (Baumrind, 1971). The final parenting style is neglectful, which is defined by a parent who is minimally involved in their child's needs and is emotionally detached from the act of parenting (Maccoby & Martin, 1983).

Parenting Styles and Feeding

The connection between parenting style and actual parenting practices varies depending on a parent's goals in socializing their child (Darling, 1993). Costanzo and Woody (1985) developed a model of domain-specific parenting, which suggests that parents alter their style of parenting depending on what situation or problem they face. These situation-specific

fluctuations in parent interactions with their child originate from the parents' personal values, their own experiences, and the level of concern they have for their child's development (Costanzo & Woody, 1985). In the realm of child feeding, parents who worry about their child's weight are especially prone to alter their parenting style when it comes to feeding. Baumrind's typology of parenting styles has been adapted to characterize caregiver feeding styles as authoritative, authoritarian, or permissive (Birch & Fisher, 1995; Patrick et al., 2005; Savage et al., 2007). Hubbs-Tait et al. (2008) found that parent feeding styles are an extension of general parenting style; therefore, measuring parenting style in regards to mealtime behaviors accounts for parent-child interactions both at and away from the table. Understanding how each parenting style impacts child behaviors and food preferences could be a critical part of overcoming feeding problems like picky eating.

Authoritative

In general, authoritative parenting has been connected to optimal child development through a democratic approach and the utilization of encouragement while promoting autonomy (Mannatah, 2005). Iannotti et al. (1994) found that encouragement, often employed by authoritative parents, successfully influenced child eating patterns. Authoritative parents set boundaries for mealtime by deciding what is served, yet manage to relinquish some control to their child by allowing them to decide what and how much to eat (Patrick & Nicklas, 2005). Additional characteristics of authoritative mealtime practices include assuming responsibility for feeding their child, parental support and involvement, modeling the consumption of fruits, vegetable, and low fat foods, as well as tracking the nutritional quality of their child's diet (Hubbs-Tait et al., 2008; Hughes et al., 2005).

The strategies associated with authoritative parenting have a positive impact on dietary variety. According to Patrick et al. (2005), authoritative parents were correlated with a greater availability of fruits and vegetables in the home, as well as more attempts to feed their child fruits and vegetables. Availability and exposure are keys to children learning to be comfortable with a wide variety of foods (Birch, 1999; Savage et al., 2007). As noted previously, Birch & Marlin (1982) demonstrated that tasting a novel food in addition to having the food presented to the child has the best effect on child consumption. Patrick's work further supported this theory by finding that authoritative parenting was also associated with greater dairy and vegetable intake in preschool children. Similar results have been seen in adolescent populations with teens who reported having authoritative parents also reported the highest consumption of fruits on a regular basis (Kremers, Brug, de Vries, & Engels, 2003).

Authoritarian

Inherently more controlling than authoritative, authoritarian parents are characterized as dominating the rules of mealtime and dictating what is served to and eaten by the child (Patrick & Nicklas, 2005). The use of power and coercion by authoritarian parents can lead to a struggle with their child over autonomy, which presents itself both at and away from the table (Hoffman, 1960). In the context of feeding, the authoritarian style is linked to a negative influence on child behavior. The control and pressure from authoritarian parents during meals can alter a child's ability to self regulate, as well as increase the dislike of new foods (Nicklas et al., 2001; Savage et al., 2007). Additionally, Hubbs-Tait et al. (2008) found that authoritarian parenting was correlated to the use of rewards and food restriction to promote proper eating habits. However, rewards do not teach children to like novel foods and discourages the acceptance of dietary

variety over the long-term (Birch et al., 1982; Rhee, 2008). Also, the restriction of favorite foods or junk foods can cause overconsumption later if children gain access to the food (Fisher & Birch, 1999a; Fisher & Birch, 2000).

While authoritative parenting supports child intake of fruits and vegetables, authoritarian parenting has the opposite effect. The beneficial influence of authoritative parents on preschool children seen in Patrick et al.'s study (2005) was reversed with the authoritarian parenting style. Instead, authoritarian parenting style was correlated with low availability of fruits and vegetables in the home, as well as decreased child consumption of these foods. Wardle and others (2005) found that the use of control, often practiced by authoritarian parents, was associated with food neophobia, as well as lower fruit and vegetable intake in children. This indicates there may be a connection between an unwillingness to try new foods and authoritarian parenting. It may be that availability of fruits and vegetables is lower in authoritarian households because parents know their children will not consume these foods (Nicklas et al., 2001); however, this has not been confirmed.

Not only does the style of authoritarian parenting have a detrimental effect on dietary variety, it also leads to weight problems in children. Rhee et al. (2006) examined the prevalence of obesity in 872 first grade students and reported that children with authoritarian parents were almost twice as likely to be overweight than children with permissive or neglectful parents, and over four-times as likely to be overweight compared to children with authoritative parents. These findings could be explained by the use of restriction and pressure by authoritarian parents, which can impact a child's ability to self-regulate energy needs (Fisher & Birch, 2000; Orrell-Valente et al., 2007; Rhee, 2008).

Permissive

Less research has focused specifically on the permissive parenting style and how it influences dietary choices in children. In general, permissive parents are more lenient at mealtimes and let their child have more control over what is served, as well as what and how much (Patrick & Nicklas, 2005). The lack of authority by permissive parents is further supported by Hubbs-Tait and other's (2008) findings that permissive parenting style was negatively correlated with monitoring their child's overall diet and the modeling of healthy food intake and positively correlated to providing rewards for consumption. Setting boundaries and maintaining a certain standard of control can have a positive effect, as seen in authoritative parents (Hubbs-Tait et al., 2008; Hughes et al, 2005). When this is lacking, which is common in permissive parents, it can promote a level of indulgence that could lead to weight issues in children (Hughes, 2008; Olvera & Power, 2010).

2.5 Concluding Remarks

Picky eating is a widespread problem in children, and parents around the world are searching for a solution. The approach needed to overcome pickiness is complex due to the independent and interactive effects that genetics, environment, peers, and parents have on child food preferences. Also, it can be difficult to assess whether a child is picky due to the overlap between picky eating, food neophobia, and general feeding behaviors. However, despite the origin of mealtime problems, one of the most influential factors in the solution is parents, who serve as role models and teachers for their children. There is a solid understanding of how parent strategies affect child mealtime behaviors, as well as, the strong connection between parent strategies and parenting styles.

From this, the question arises of how parenting styles relate to picky eating. Are certain types of parents prone to encouraging or discouraging picky behaviors? To our knowledge, there is minimal research exploring this direct connection. Thus, the purpose of this research was to elucidate this relationship and assist in the pursuit for methods that promote healthy independent eaters. To achieve that goal, several specific aims were undertaken: 1) Compare the differences in food availability for picky and non-picky eaters (Chapter 3), 2) Qualitatively explore the parental perceptions of picky eaters according to three major parenting styles (Chapter 4), 3) Quantitatively measure the correlation between picky behaviors and three major parenting styles (Chapter 5), and 4) Subjectively and objectively assess picky eating perceptions and compare the prevalence of picky behaviors across environments (Chapter 6).

CHAPTER 3
Comparison of Child Consumption by PE and NPE Toddlers and Food Availability in the Home

3.1 Abstract

Picky eaters consume a limited diet and are unwilling to try new foods. One method shown to increase acceptance of liking of both new and familiar foods is repeated exposure. Parents play an important role in exposure and making foods available to their child because they are the primary providers in the home. The objective of this study was to examine the differences in food variety consumed between perceived picky eater (PE) and non-picky eater (NPE) children ages 24-48 months and to investigate whether food availability in the home is linked to picky eating status. Data were compiled from a Food Inventory Survey completed by parents of PE (n=83) and NPE (n=88). A list of 140 food items classified into 13 categories was presented and parents selected which foods were served in the home and which were consumed by their child. Parental responses were graphed and differences were analyzed by Chi-Square for significant associations with the picky eating status ($p<0.05$). Perceived NPE ate a wider variety of food items than PE. Of the140 food items, 75 were consumed significantly more by NPE. The greatest differences were seen in the fruits, vegetables, legumes and meat categories. When comparing food availability in the home, only 7 of 140 food items were reported to be served significantly more by parents of NPE. While NPE consumed a greater dietary variety than PE, the availability of foods reported by the parents to be served in the home indicated the children had similar exposure. Therefore, food availability was not linked to picky eating.

3.2 Introduction

A picky eater (PE) can be defined as an individual who consumes a limited diet, is unwilling to try new foods (food neophobia), and has specific likes or dislikes (Dovey et al., 2008; Jacobi, Agras, Bryson, & Hammer, 2003; Mascola et al., 2010). The foundation of the definition lies in having lower dietary variety compared to children who are considered not picky. Carruth and colleagues (1998) showed that toddlers who were described by their parent as a PE consumed significantly lower dietary variety than non-picky eaters (NPE). Additionally, previous research in our laboratory by Mayeux-Boquin (2010) showed that out of a 140 food inventory, 75 foods were consumed by significantly greater percent of toddlers described by their parents as NPE compared to those described as PE. The categories of foods that PE consumed less frequently than NPE included fruits, vegetables, and protein sources such as legumes and meats (Mayeux-Boquin, 2010).

The difference between dietary choices in PE and NPE brings up the question of food exposure and whether they have access to the same variety of foods. Psychologically, a person's perception of an item through "mere exposure" can increase their liking of that item (Zajonc, 1968). This applies to food as well because frequent contact and tasting of an unwanted food can improve acceptability and consumption in toddlers (Birch & Marlin, 1982; Savage et al., 2007). Even vegetables, which children often have a strong aversion towards, can become more acceptable after numerous exposures at mealtimes (Wardle et al., 2003; Zeinstra et al., 2009).

Parents and caregivers are the main influencers of dietary exposure for toddlers. As the gatekeepers of food into the home, they determine what is available, as well as what and how much is served to the child (Cullen et al., 2001; Savage et al., 2007). Parents are in charge of what foods are available, including healthy options like fruits and vegetables, which often have

low intake among picky eaters (Carruth et al., 1998; Mayeax-Boquin, 2010). By making these foods more accessible and repeatedly encouraging them to try the food, parents can have a positive impact on fruit and vegetable consumption (Birch et al., 1987; Hearn et al., 1998; Kratt, et al., 2000). Food availability can increase a child's self-efficacy related to their ability to try new foods; however, for toddlers, availability is out of their control and they must rely on their caregivers as providers (Baranowski, Cullen, & Baranowski, 1999; Domel et al., 1996).

The purpose of this study was to assess the differences in the variety of foods consumed between perceived PE and NPE children aged 24-48 months and to investigate whether food availability in the home is linked to PE status. Mayeaux-Boquin and colleagues (2010) reported that there was a significant difference in the dietary variety consumed by PE and NPE toddlers; however, whether foods consumed was influenced by what foods were made accessible by the parent was not investigated. Since exposure can increase food acceptance, it may play a role in a toddler's dietary habits. We hypothesized that a difference would be present between what parents of PE and NPE serve in the home, with NPE parents making a greater variety of foods available to their children, which will affect toddler consumption.

3.3 Materials and Methods

Subjects

Parents (n=171) with a child between 24-48 month-of-age were recruited from the Grand Rapids, MI area as part of the Early Childhood Mealtime Study (ECMS) conducted by Mayeaux-Boquin (2010). The children were dichotomized into PE or NPE status based on his or her parents response to the control question "Is your child a Picky Eater" on a 5-point scale (1=Never, 2=Rarely, 3=Sometimes, 4=Often, 5=Always). This question was asked multiple

times throughout recruitment and testing during the ECMS and the scores were averaged. If the child received a mean score of 3 or greater, he or she was considered a PE, while those with a score less than 3 were categorized as NPE. In total, there were 83 PE and 88 NPE parent-child pairs.

Survey Measures

As a part of ECMS, parents completed a Food Inventory Survey (FIS, Appendix A) that contained 140 food items grouped into categories, including fruits, vegetables, legumes/grains, dairy, meat/fish/eggs, mixed dishes, fats/oils, snacks, and supplements. Food items were selected based on the U.S. Food and Drug Administration's (FDA) Total Diet Study (TDS) (Egan, Bolger, & Carrington, 2007). For each item, parents indicated whether it was, "Not served in the parent's household now", and "Not eaten by the parent's child now."

Statistical Analysis

The initial analysis conducted by Mayeaux-Boquin (2010) included a comparison of foods consumed by PE and NPE children. Additionally, the differences between what PE and NPE parents ate as a child, currently eat now, were served as a child, and currently serve in the home now were compared. The non-parametric Pearson's Chi-Square test was conducted with XLSTAT (Version 2009, Addinsoft USA, New York, NY). Further analysis during this phase of the study included creating graph representations of the data for what PE and NPE children eat, as well as what their parents report serving in the home. Also, Pearson's Chi-Square was conducted to assess the differences between what PE consume versus what their parents report

serving in the home. The same comparison was done for NPE children. All results were portrayed as percentages of total respondents using Microsoft Excel 2010.

3.4 Results and Discussion

Previous Findings

Child Consumption

Mayeaux-Boquin (2010) showed that there was a significant difference between what PE and NPE consume, as reported by parents. Out of 140 foods, 75 were eaten significantly more by NPE than PE (Chi-square for independence, $p<0.05$). Most differences were seen in the fruits, vegetables, legumes, meat/fish/eggs, and mixed dishes categories with minimal differences in the grains, dairy, and snacks categories. Out of 45 fruits and vegetables, 35 were consumed significantly more by NPE. The only fruits and vegetables that showed no difference were 100% apple juice, apples, 100% grape juice, grapes, raisins, banana, okra, beets, greens (mustard, turnip, kale), and French fries/tater tots (**Figures 3.1 and 3.2**). This is consistent with the results of the Feeding Infants and Toddlers Study (FITS), which showed that the most commonly consumed fruits in the 19-24 month age group were bananas, apples and grapes, while the most consumed vegetable in this age group was French fries/other fried potatoes (Fox et al., 2004). No difference was seen for okra, beets, and greens due to consumption being less than 25% in both PE and NPE groups. In general, fruit and vegetable consumption is low among young children. NHANES data from 2001-2004 showed that children age 1-3 consumed on average 1.5 fruits and 0.7 vegetables servings per day ("Usual Dietary Intakes", 2010). Mayeaux-Boquin (2010) showed that the intake of fruits and vegetables is less in picky eaters and Cooke (2004)

confirmed food neophobia as a predictor of low fruit and vegetable intake in preschool aged children.

The other foods consumed significantly less by PE than NPE were all 7 foods in the legumes category, 16 out of 20 foods in the meat/fish/eggs category, and 7 out of 10 foods in the mixed dishes category (**Figures 3.3-3.5**). Similar results were previously described in the literature. In a study by Skinner, Carruth, Bounds, and Ziegler (2002), dislike for legumes, such as beans and peas, was high among all children and a large portion of children had never even tasted these foods. Regarding the differences in meat/fish/eggs and mixed dishes, the dietary variety assessed in the FITS showed lower intake of both protein sources and mixed dishes by PE than NPE (Carruth et al., 2004). According to our FIS data, 85.5% of PE and 93.2% of NPE consume hot dogs, while 95.2% of PE and 95.5% of NPE consume breaded chicken, which is in line with chicken/turkey and hotdogs/cold cuts being the predominant protein sources consumed by toddlers in FITS (Fox et al., 2004).

Food Availability

When comparing foods reportedly served in the home by parents of PE and NPE, there were minimal significant differences. Out of 140 foods, only 7 were reported to be served significantly less by parents of PE and were only in the vegetables and legumes groups. These foods were 100% tomato juice, cabbage/coleslaw, squash, zucchini, grits, black/white beans, and refried beans, all from the vegetables and legumes groups (**Figures 3.7 and 3.8**) There were no reported differences seen in the fruits, meat/fish/eggs, and mixed dishes categories served in the home of parents of PE and NPE children (**Figures 3.6, 3.9 and 3.10**). The limited differences between what parents of PE and NPE report serving to their child infers that there is a similar

dietary variety provided by both sets of parents. This does not explain the dissimilarity in PE and NPE food choices. Based on the findings from the literature, the presence of foods like fruits and vegetables in the home should increase their consumption in children (Cullen et al., 2001; Kratt et al., 2000); however, this does not appear to be the case in the FIS results.

Further Analysis

Continued analysis of the FIS results confirmed a gap between what parents reportedly serve to their child and what they said their child currently eats. Starting with the fruits category, the only four foods that were consumed by as many PE as the number of PE parents that serve that food were: apricots, 100% grape juice, 100% orange juice, and 100% apple juice. The other 16 fruits were served by parents at a higher rate than child consumption (**Figure 3.11**). Yet for NPE children, 18 of the 20 fruits were consumed by the same percentage of children as were served by their parents (**Figure 3.12**). For example, bananas and apples were served by 100% of parents and consumed by 100% of NPE. These same foods were served by 100% of parents in PE homes but only 95% of children ate bananas and 93% ate apples. The trend seen in the fruits group was also similar for vegetables. For PE, only 3 of the 25 vegetables were served by parents and regularly consumed by the child (**Figure 3.13**), while NPE children showed no differences in what was served and eaten for 14 out of the 25 vegetables (**Figure 3.14**). One example of a food served frequently by both set of parents was corn. While 100% of PE parents served corn, only 86% of PE consumed it, which was significantly different. However, 99% of NPE parents served corn and 97% of children ate it, which was not significantly different.

In the legumes/grains, meat/fish/eggs and mixed dishes categories, it was also found that parents of PE reported serving a wider variety of foods than what they indicated their child eats.

Figure 3.15 shows that there are no legumes, except for peanuts and peanut butter that were consumed by PE as frequently as their parents served them. Additionally, white bread was reported as being eaten by 87% of PE, but only served by 73% of their parents. This was significantly different and indicates that parents may be considering foods consumed by their child outside of the home in addition to what is served in the home. There were only three foods out of 20 that showed no significant difference in what is consumed and served for PE in the meat/fish/eggs category, which were liver and fish sticks (**Figure 3.17**). Even hotdogs, which generally have high acceptance in toddlers (Fox et al., 2004) were only eaten by 85.5% of PE which was significantly less than then 96% of parents that serve hotdogs. In general, among NPE children, meat/fish/eggs were consumed if the food is served by their parent with the only differences seen in egg and seafood items **(Figure 3.18**). Similar results were seen for the NPE group for mixed dishes with no differences in what is eaten and served (Figure 3.20); however, for the PE group the only mixed dishes out of the ten listed that were reported to be eaten and served in similar numbers were Happy Meals™, macaroni and cheese, and pizza (**Figure 3.19**). Spaghetti, tacos, meat and potatoes, casserole, chicken pot pie, stew, and stuffed peppers were all consumed by 80% or less of PE.

These results imply that it takes more than simply exposing a child to fruits and vegetables to increase their consumption of those foods. Birch and others (1987b) demonstrated that along with repeated visual exposure, tasting a food too has the strongest effect on liking. One limitation is that it is unknown from these results whether or not children in the study tasted all of the foods parents reportedly served in the home. This may explain some of the variation between what is served and what is consumed. Another limitation is there was no frequency measure in the FIS to assess how often each food item is presented to the child. Although the

survey was standardized across all parents, there may be different interpretations for foods being served in the home, whether this means it is served often, or as infrequently as one time. It may take as many as 10 to 16 exposures to a new food in a non-threatening environment in order for a child to shift their acceptance towards liking (Savage et al., 2007); therefore, one exposure may not be enough if the food is disliked.

Despite these limitations, the results of the ECMS indicate that food availability in the home was not sufficient alone to increase consumption in PE. Parents of PE reported serving a similar variety of foods in the home as parents of NPE, yet there were still significant differences for intake. The parent and child mealtime interactions that occur must also be influencing whether a child exhibits picky behaviors. There are multiple strategies that parents utilize in an attempt to overcome mealtime difficulties; however, some of these strategies can negatively impact the child's food preferences. When parents use pressure, restriction or control during meals, it can ultimately decrease a child's preference for a wide variety of foods and may even promote weight gain (Faith, 2004; Galloway et al., 2005; Scaglioni et al., 2008). Parents in the Early Childhood Mealtime Study completed an assessment regarding parent mealtime strategies and the parents of PE used significantly more strategies than parents of NPE, including, "Withhold sweets or snacks to your child as a consequence for not eating food that is served at a meal" (Mayeaux-Boquin, 2010). Thus, the low dietary variety of picky eaters in this study may partially be explained by the interactions parents have with their PE children.

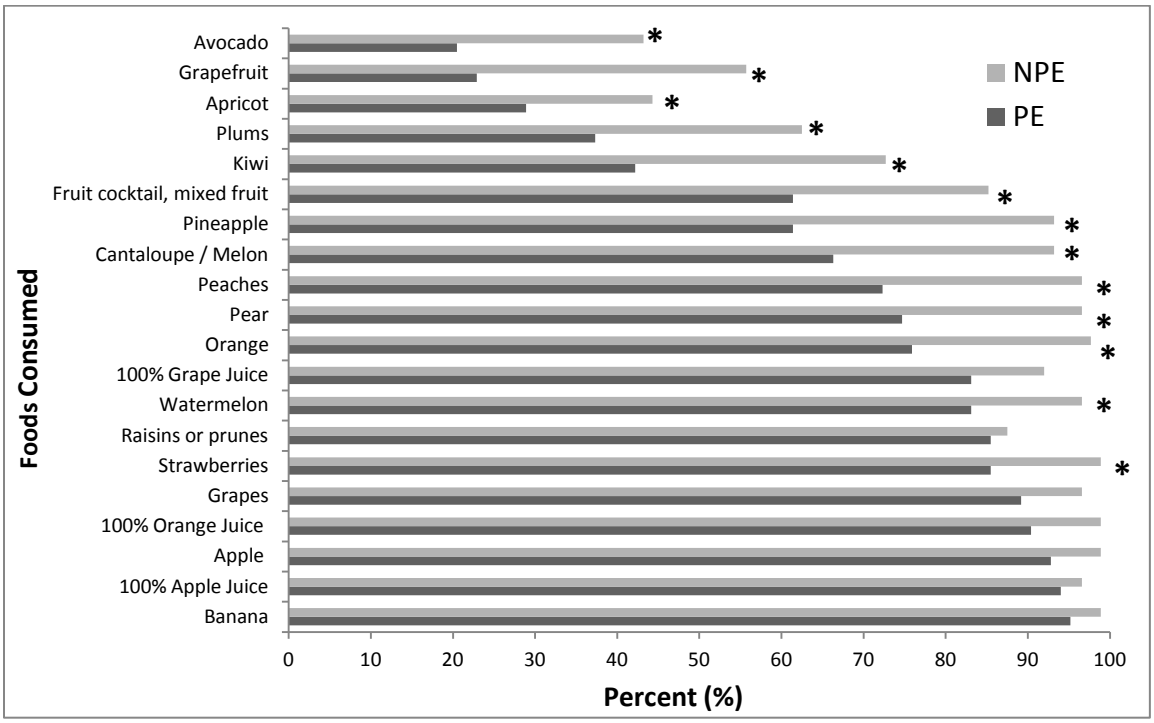
3.5 Conclusions

In this study, food availability was not linked to picky eating status. It is clear that PE children have a much more restricted range of acceptable foods compared to NPE; however,

simply making foods such as fruits and vegetables available may not be sufficient to create dietary change among PE. Picky eating is a complex issue that is influenced by a variety of factors. As the providers for the homes, parents play an integral role in helping their children to become healthy independent eaters. What they serve, how they offer it and how many times they offer it, and how they interact with their child during meals can all impact mealtime behaviors. More research is needed in order to understand the relationship of parents and picky eaters. Chapters 4, 5, and 6 further explore this parent-child dynamic and whether different parenting styles impact PE behaviors in children.

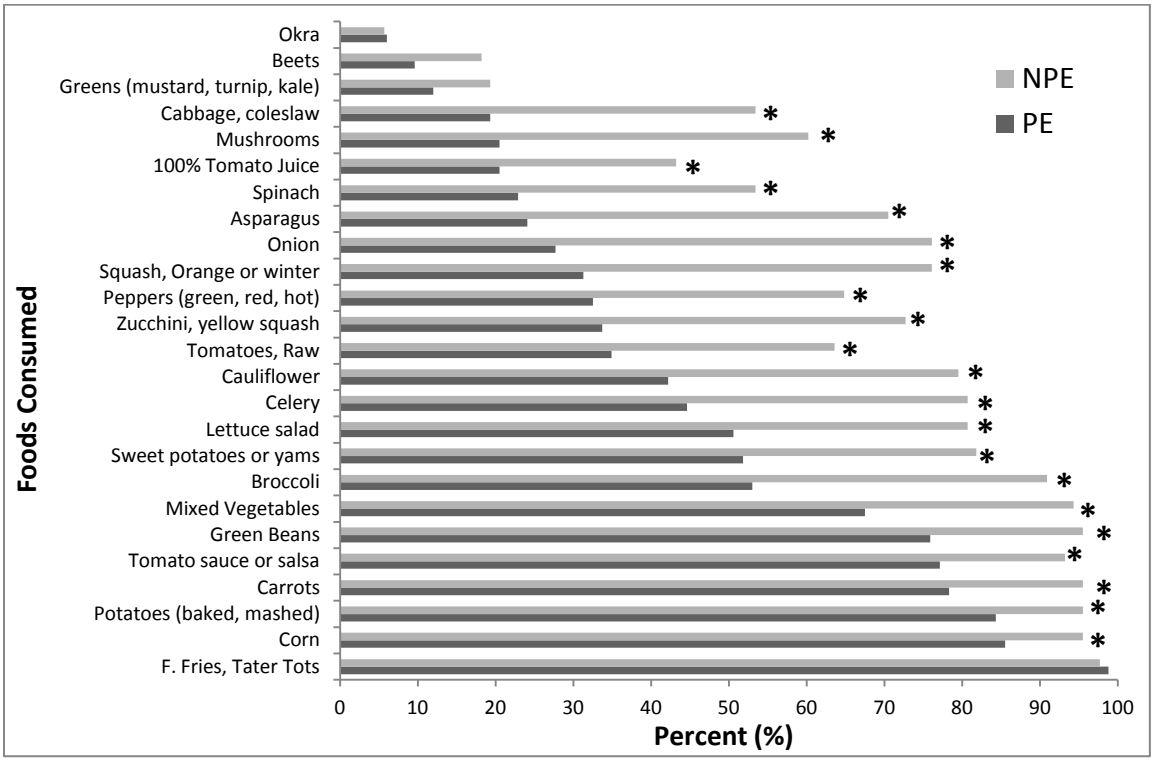
3.6 Figures

Figure 3.1 Consumption of FRUITS by picky eaters (PE, n=83) and non-picky eaters (NPE, n=88)



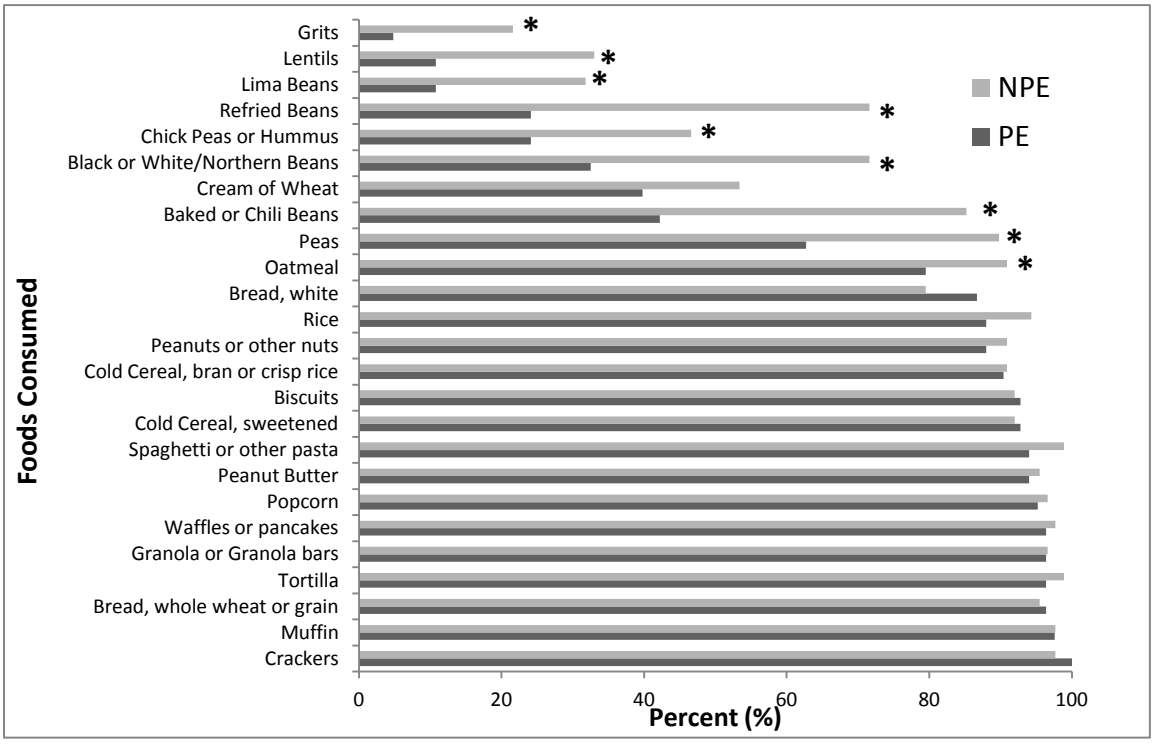
* Statistically significant as determined by Chi-Square ($p<0.05$)

Figure 3.2 Consumption of VEGETABLES by picky eaters (PE, n=83) and non-picky eaters (NPE, n=88)



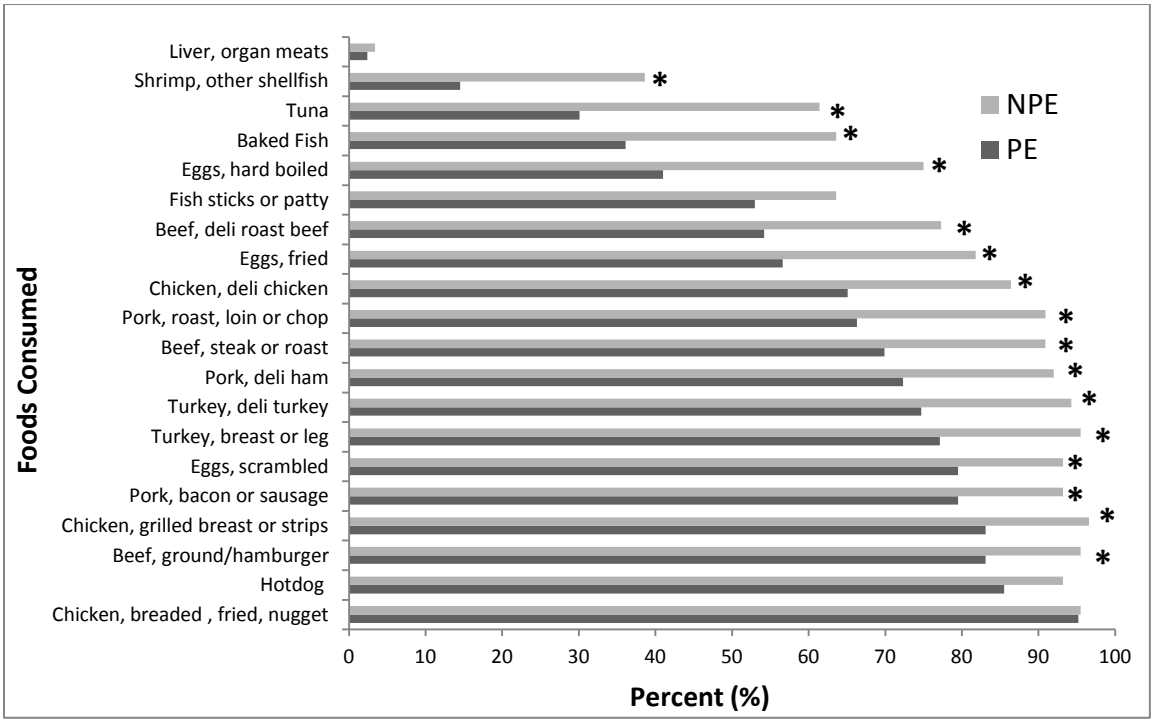
* Statistically significant as determined by Chi-Square ($p<0.05$)

Figure 3.3 Consumption of LEGUMES & GRAINS by picky eaters (PE, n=83) and non-picky eaters (NPE, n=88)



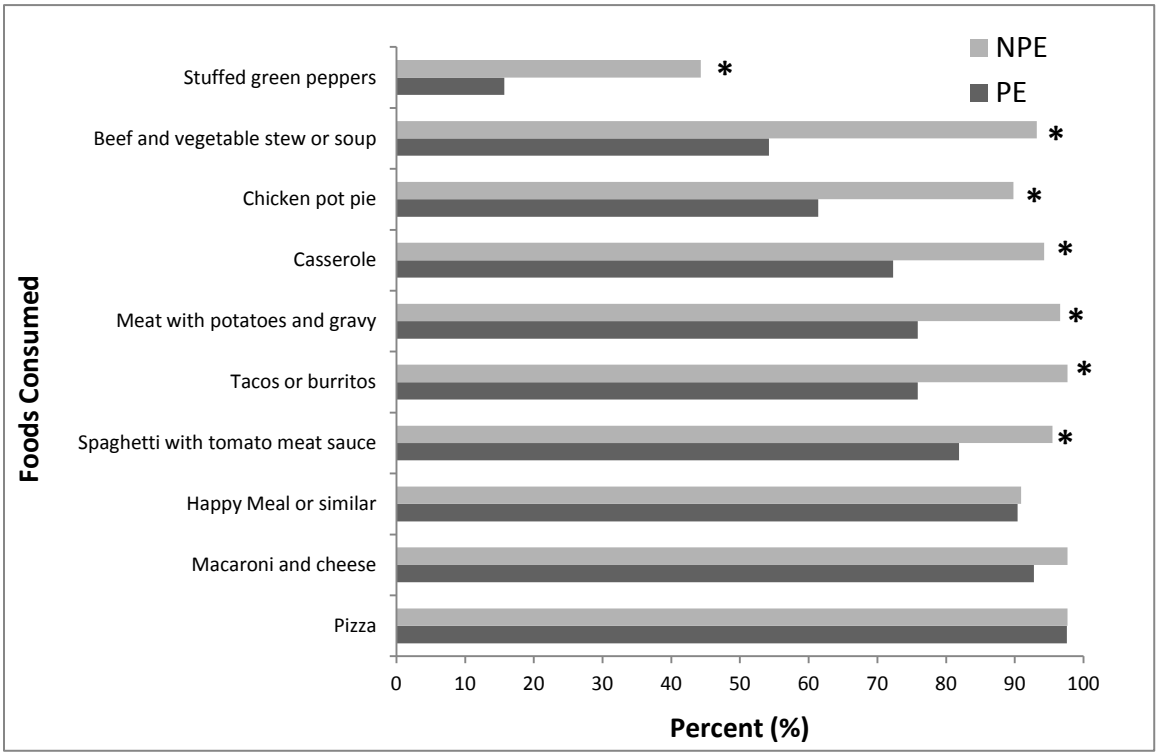
* Statistically significant as determined by Chi-Square ($p<0.05$)

Figure 3.4 Consumption of MEAT, FISH & EGGS by picky eaters (PE, n=83) and non-picky eaters (NPE, n=88)



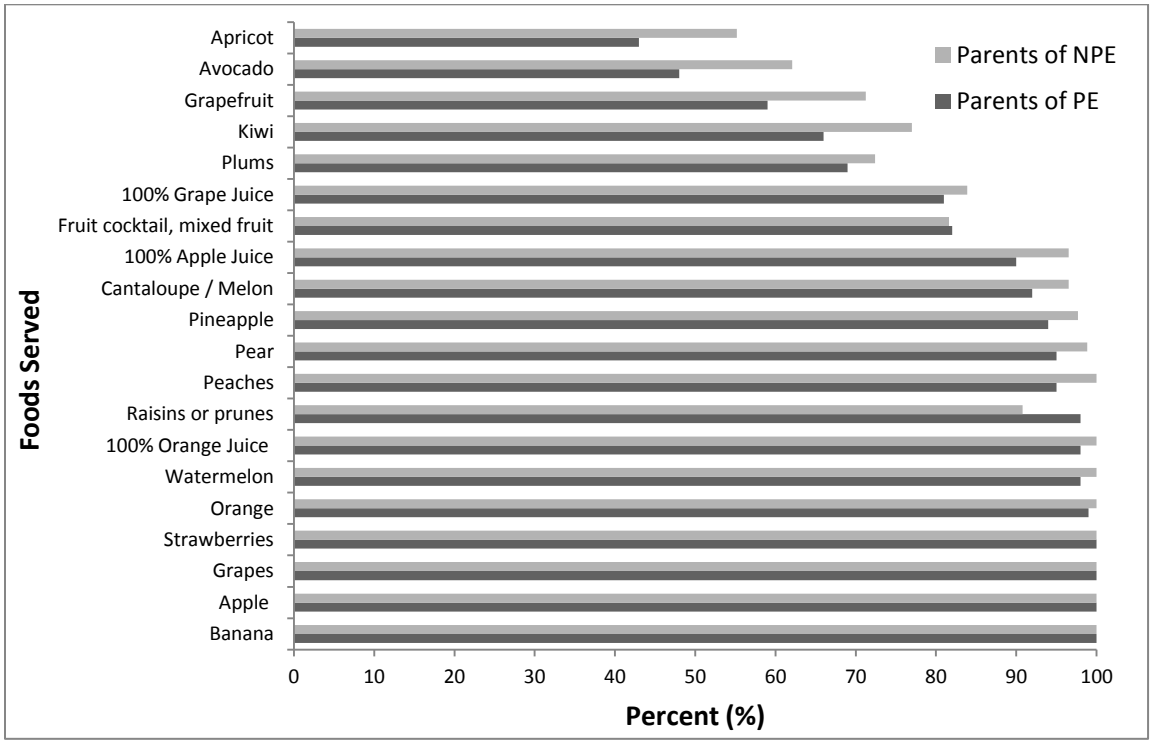
* Statistically significant as determined by Chi-Square ($p<0.05$)

Figure 3.5 Consumption of MIXED DISHES by picky eaters (PE, n=83) and non-picky eaters (NPE, n=88)



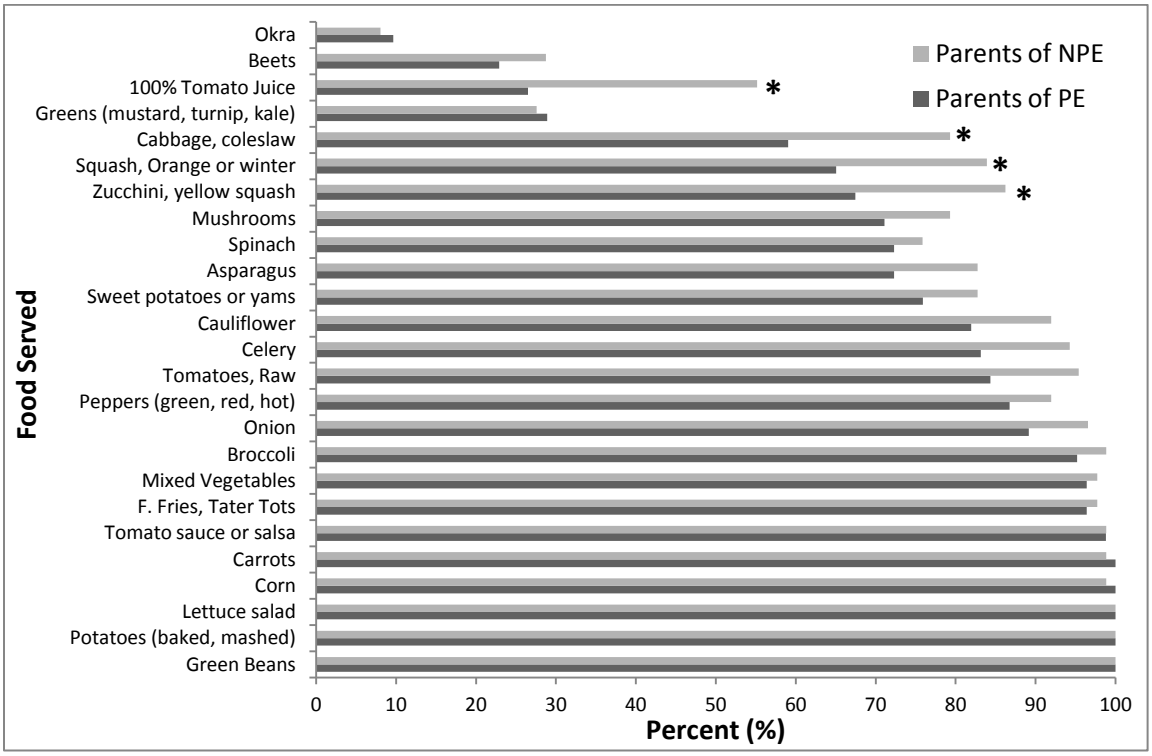
* Statistically significant as determined by Chi-Square ($p<0.05$)

Figure 3.6 FRUITS served by parents of picky eaters (PE, n=83) and non-picky eaters (NPE, n=88)



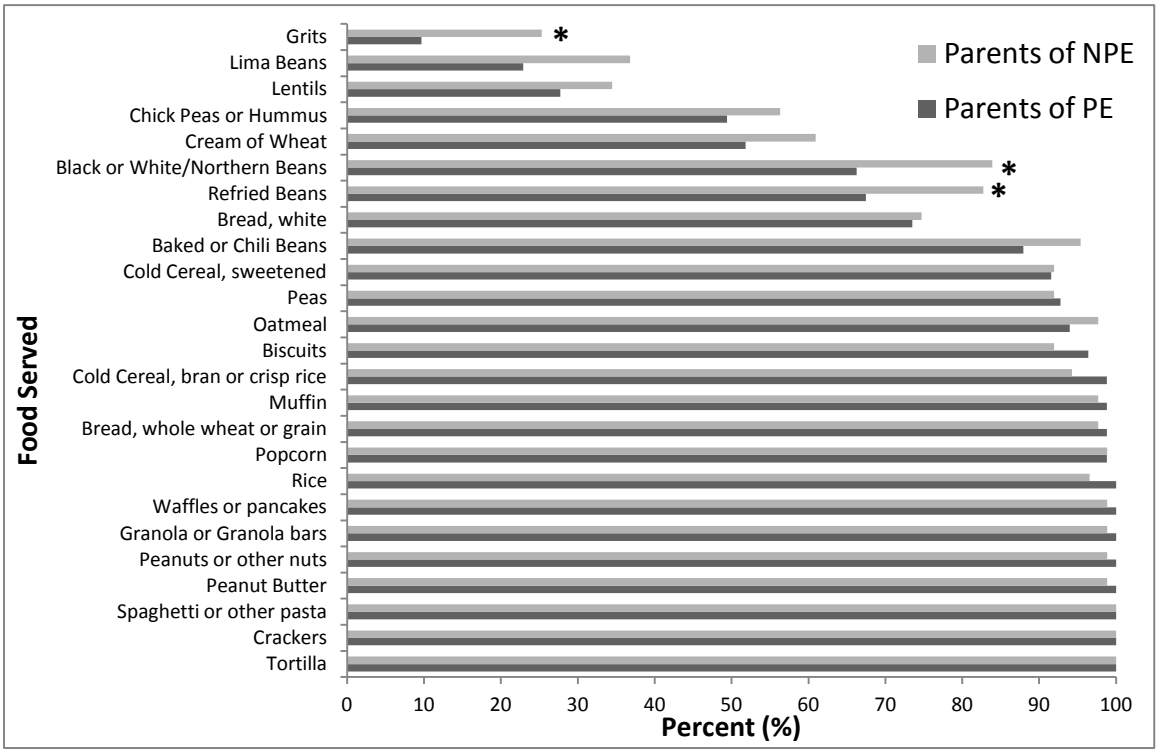
* Statistically significant as determined by Chi-Square ($p<0.05$)

Figure 3.7 VEGETABLES served by parents of picky eaters (PE, n=83) and non-picky eaters (NPE, n=88)



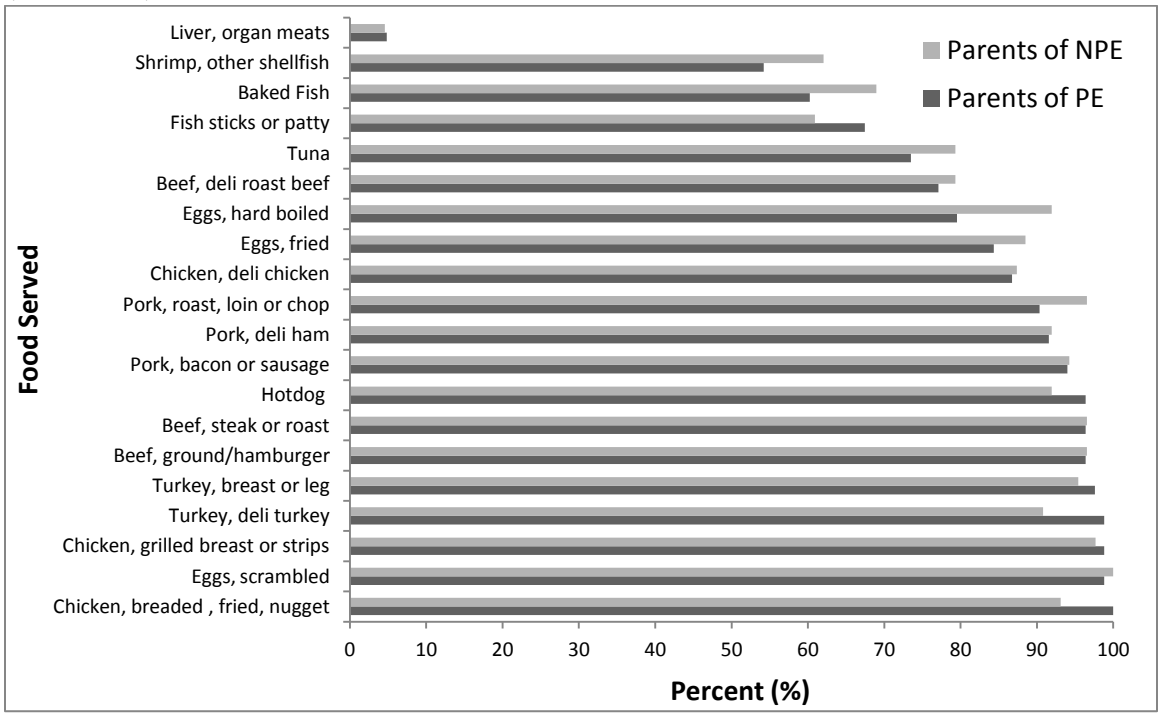
* Statistically significant as determined by Chi-Square ($p<0.05$)

Figure 3.8 LEGUMES & GRAINS served by parents of picky eaters (PE, n=83) and non-picky eaters (NPE, n=88)



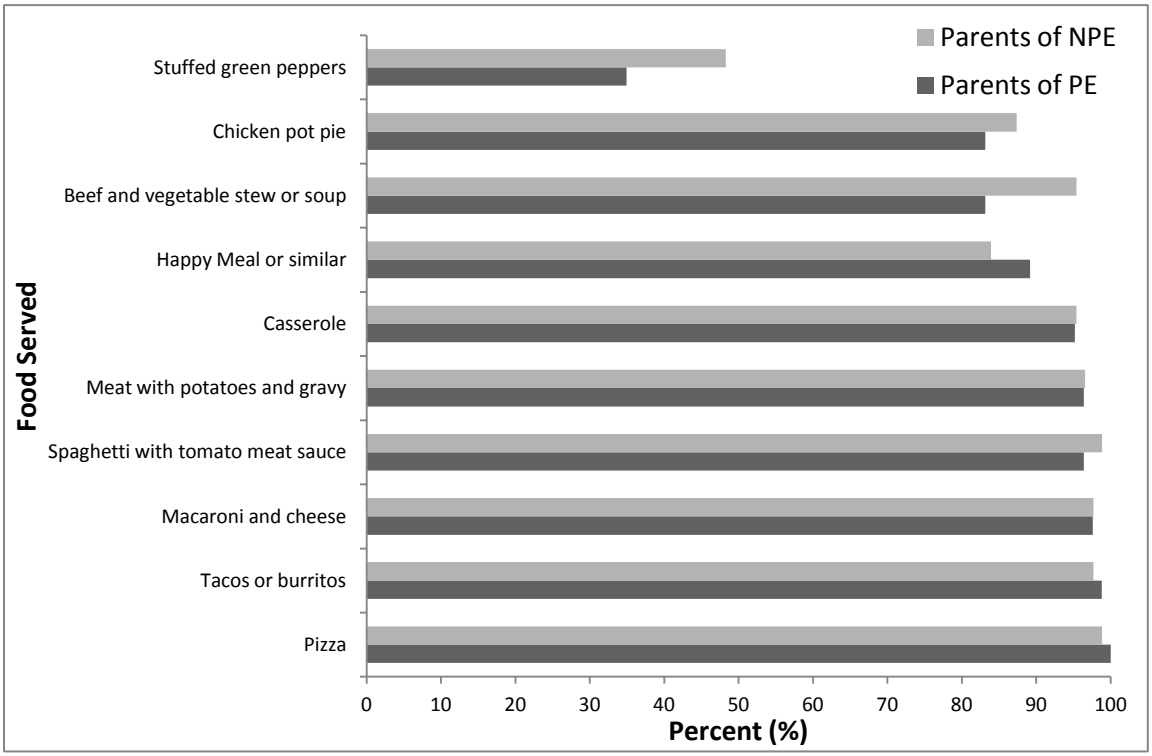
* Statistically significant as determined by Chi-Square ($p<0.05$)

Figure 3.9 MEAT, FISH & EGGS served by parents of picky eaters (PE, n=83) and non-picky eaters (NPE, n=88)



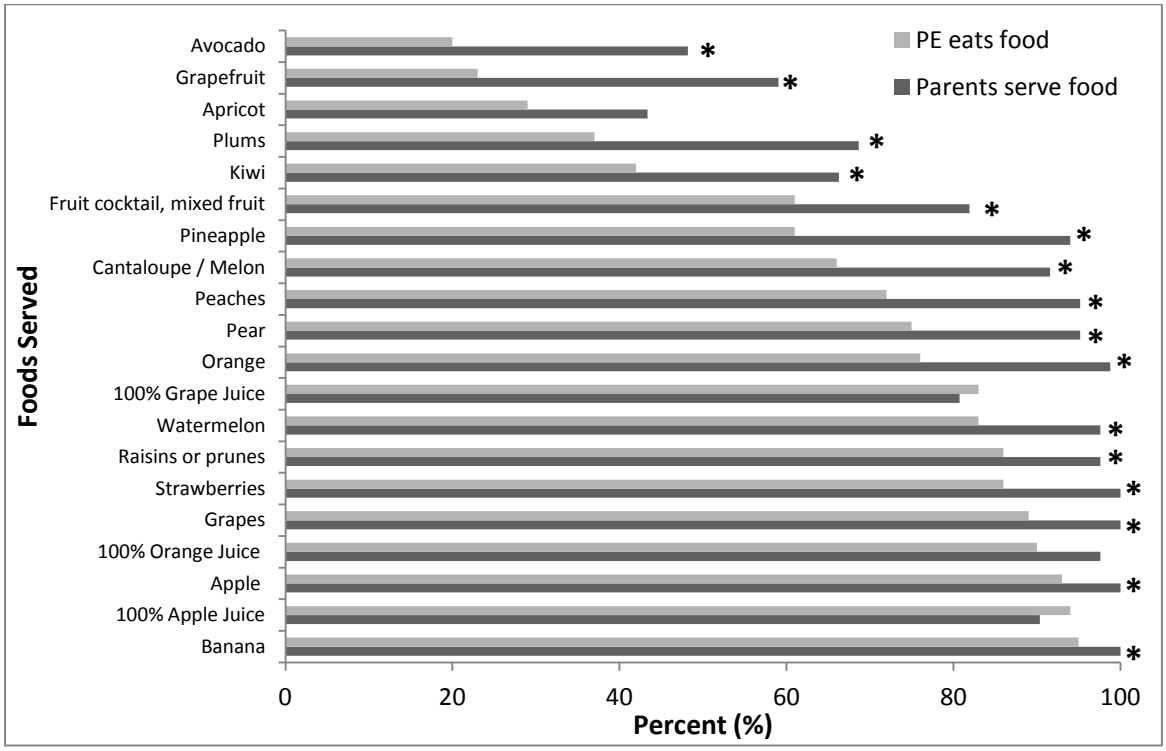
* Statistically significant as determined by Chi-Square ($p<0.05$)

Figure 3.10 MIXED DISHES served by parents of picky eaters (PE, n=83) and non-picky eaters (NPE, n=88)



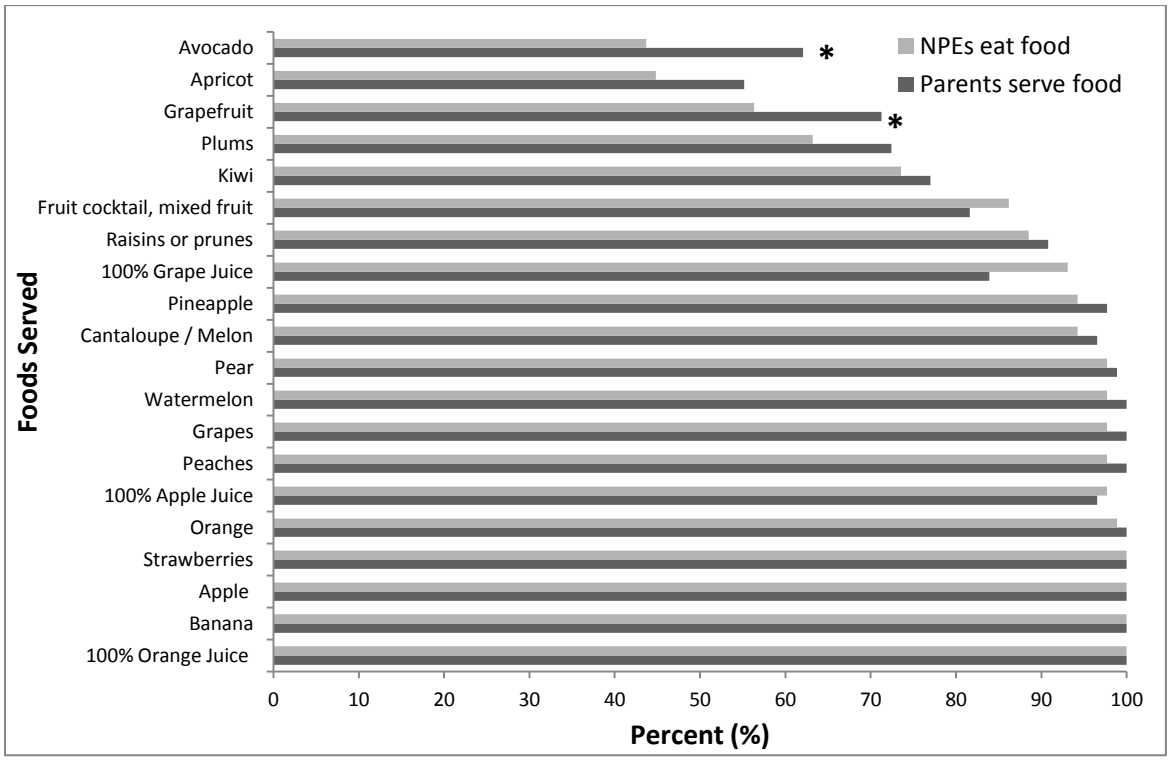
* Statistically significant as determined by Chi-Square ($p<0.05$)

Figure 3.11 FRUITS served by parents of picky eaters (PE, n=83) and consumed by PE



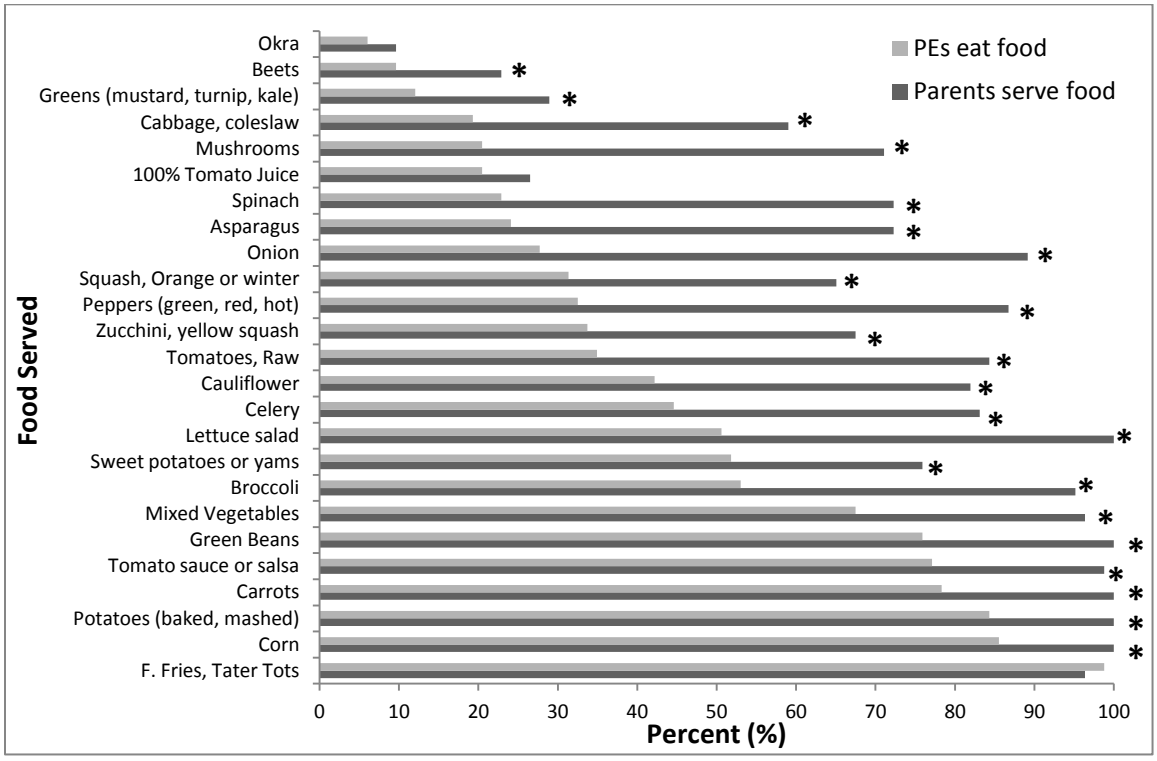
* Statistically significant as determined by Chi-Square ($p<0.05$)

Figure 3.12 FRUITS served by parents of non-picky eaters (NPE, n=88) and consumed by NPE



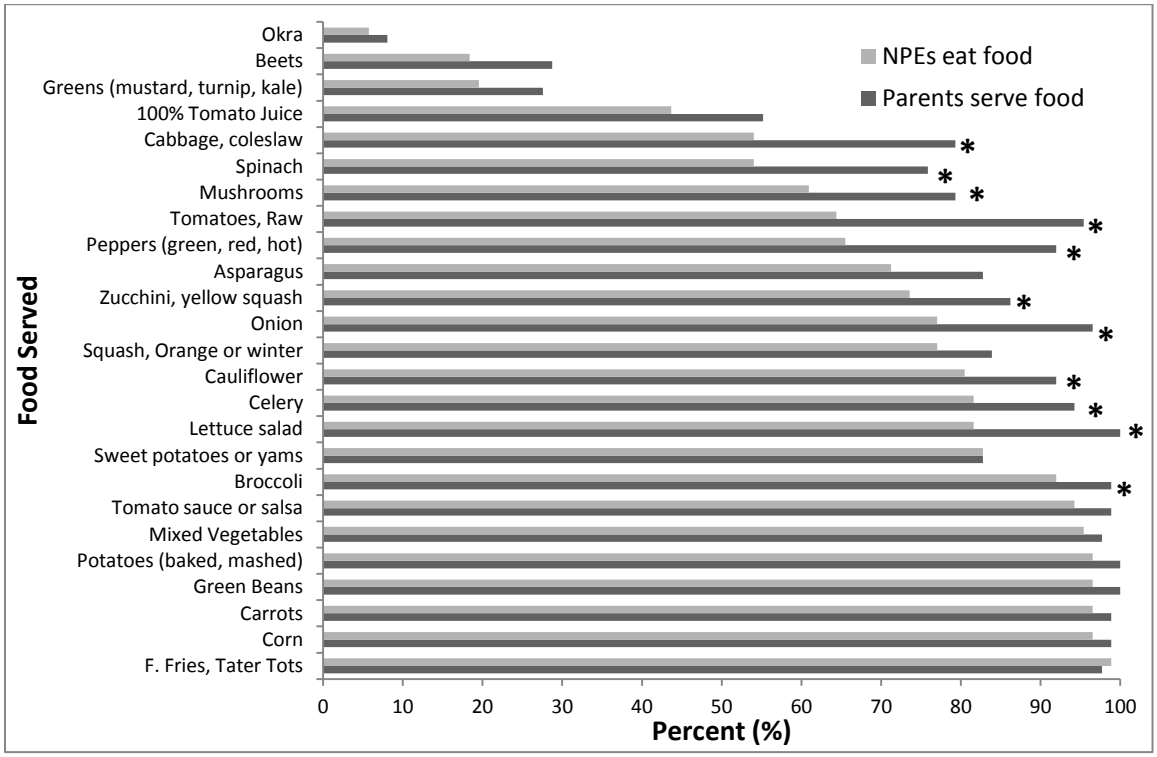
* Statistically significant as determined by Chi-Square ($p<0.05$)

Figure 3.13 VEGETABLES served by parents of picky eaters (PE, n=83) and consumed by PE



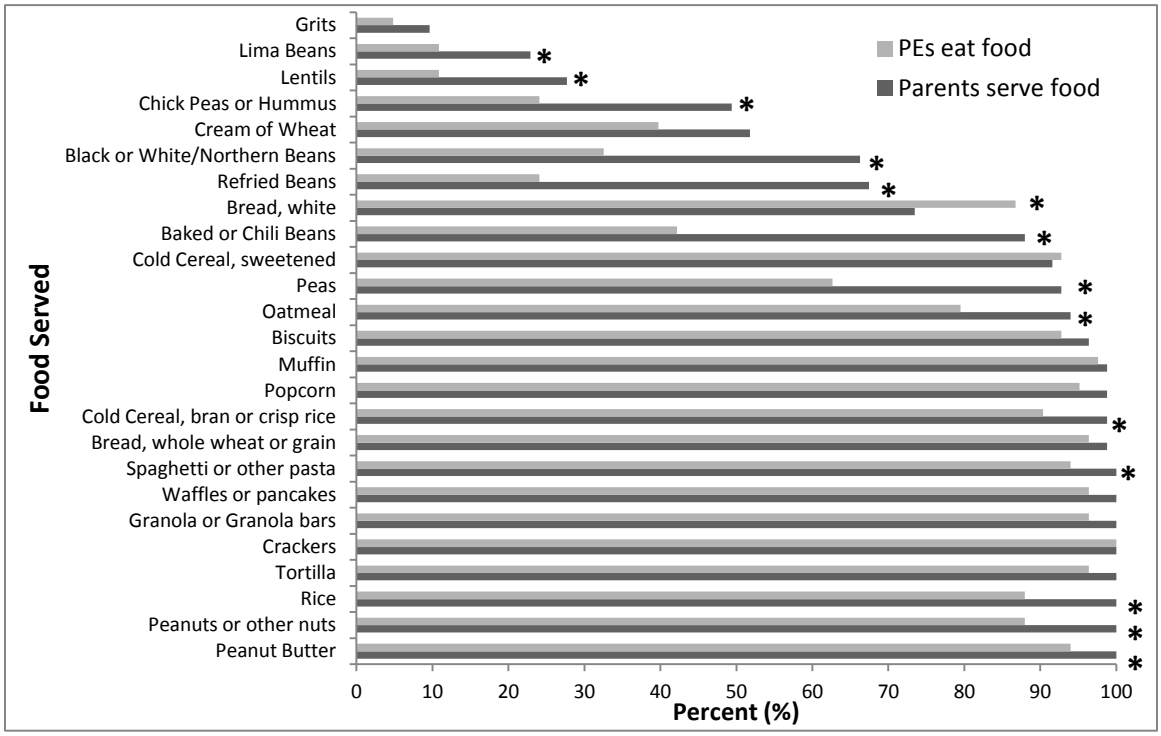
* Statistically significant as determined by Chi-Square ($p<0.05$)

Figure 3.14 VEGETABLES served by parents of non-picky eaters (NPE, n=88) and consumed by NPE



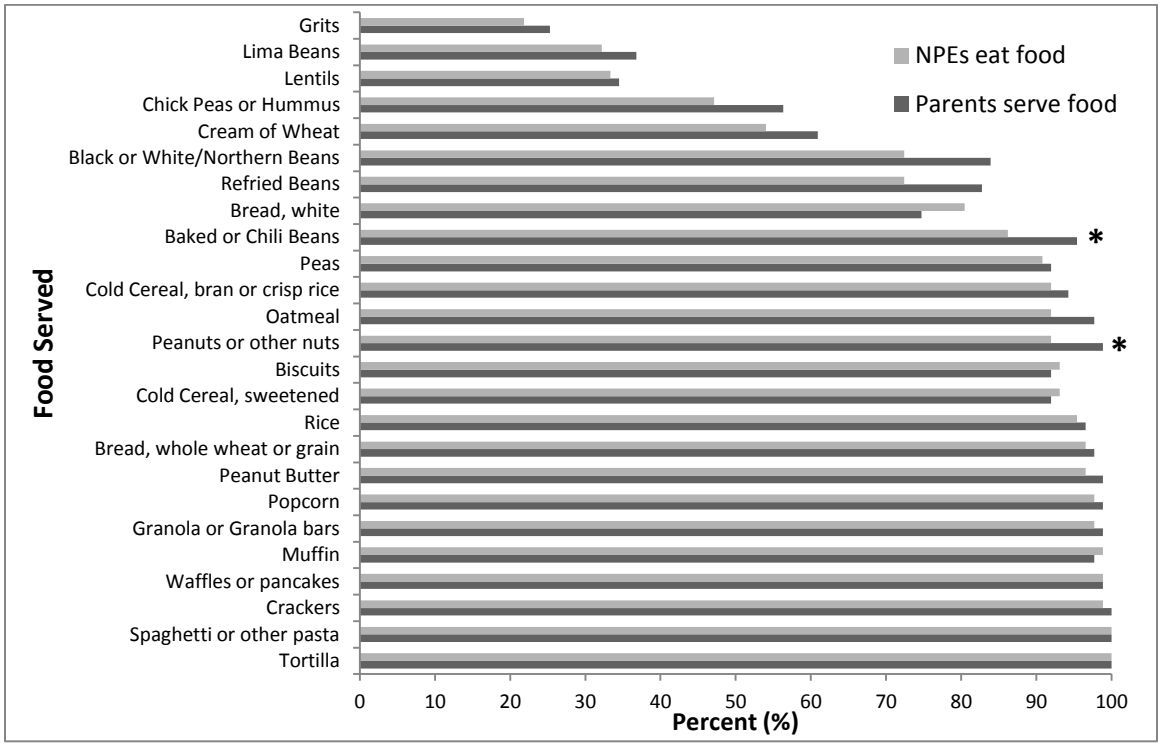
* Statistically significant as determined by Chi-Square ($p<0.05$)

Figure 3.15 LEGUMES & GRAINS served by parents of picky eaters (PE, n=83) and consumed by PE



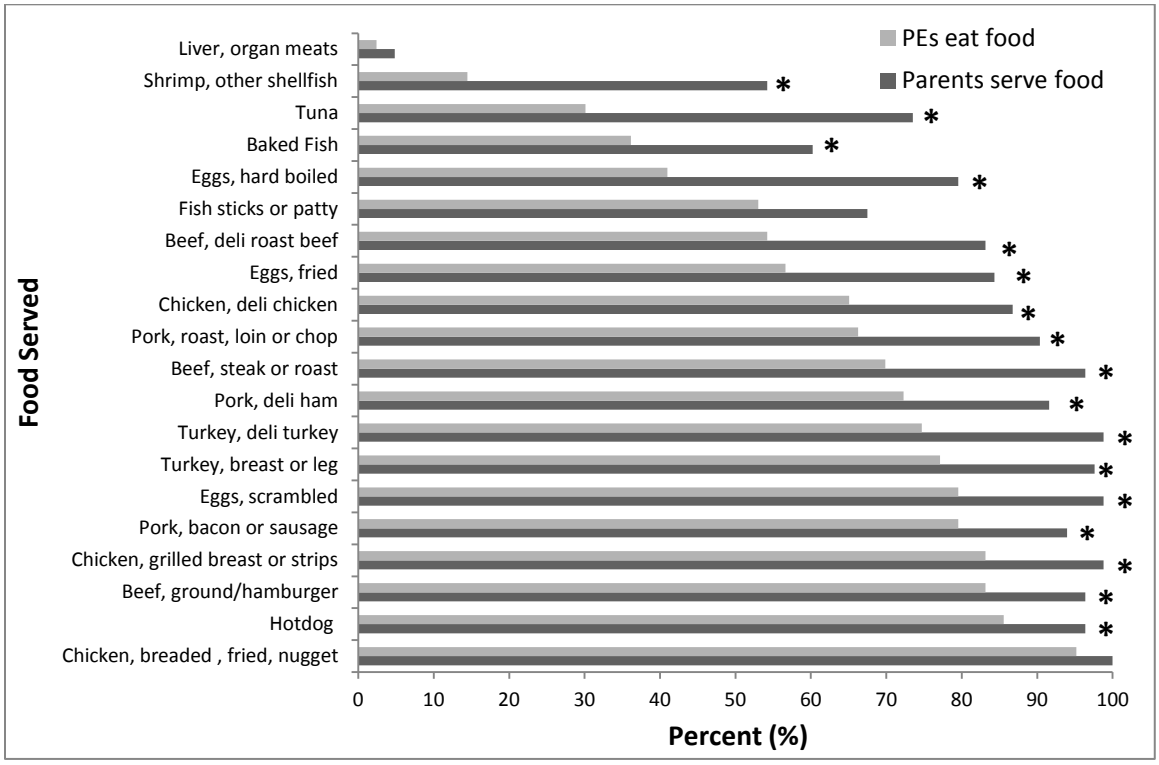
* Statistically significant as determined by Chi-Square ($p<0.05$)

Figure 3.16 LEGUMES & GRAINS served by parents of non-picky eaters (NPE, n=88) and consumed by NPE



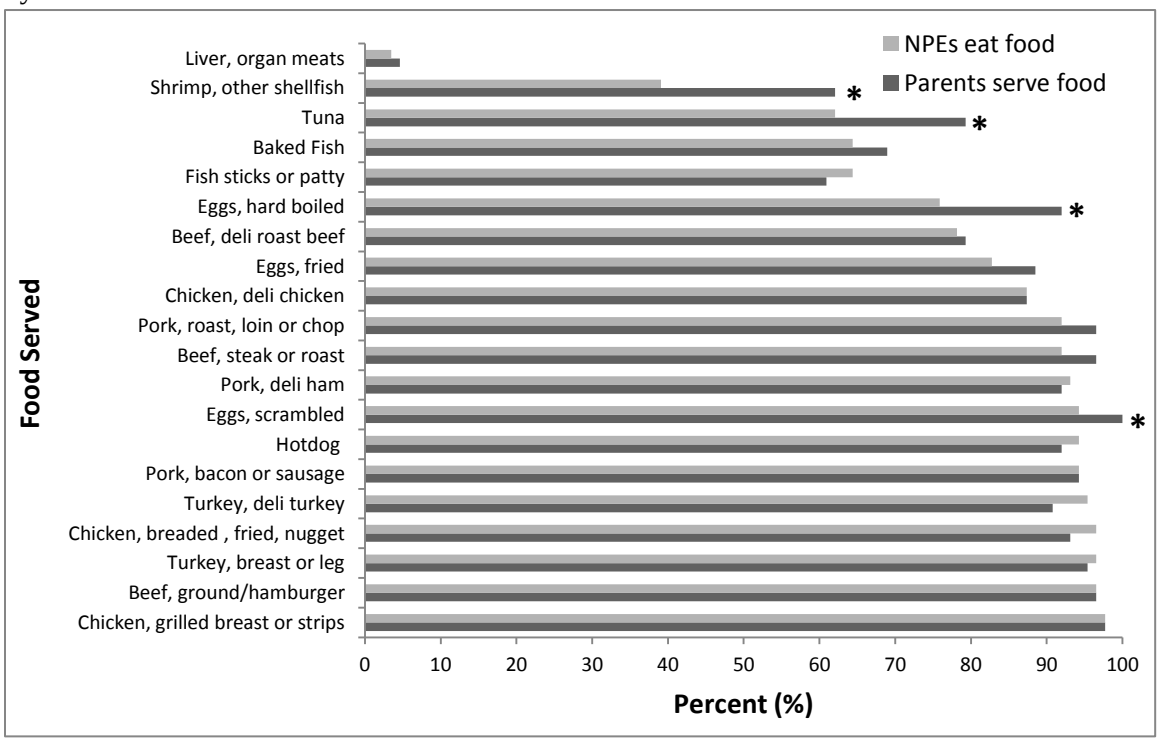
* Statistically significant as determined by Chi-Square ($p<0.05$)

Figure 3.17 MEAT, FISH & EGGS served by parents of picky eaters (PE, n=83) and consumed by PE



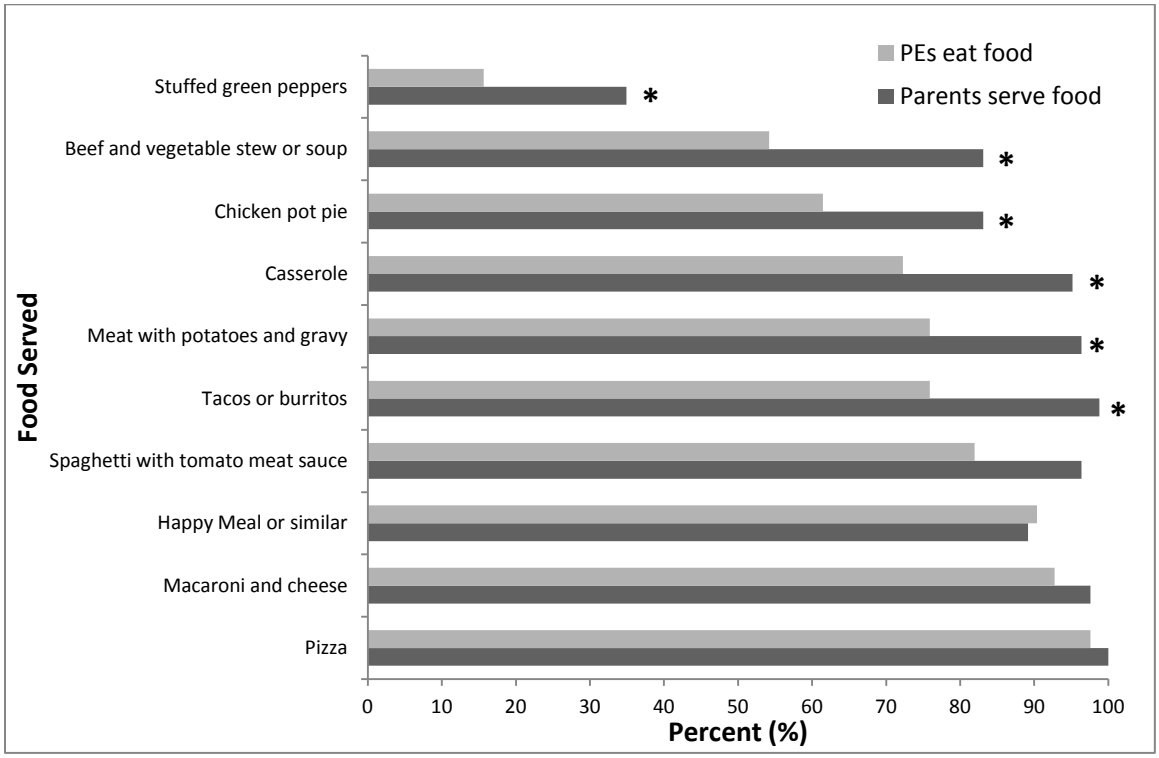
* Statistically significant as determined by Chi-Square ($p<0.05$)

Figure 3.18 MEAT, FISH & EGGS served by parents of non-picky eaters (NPE, n=88) and consumed by NPE



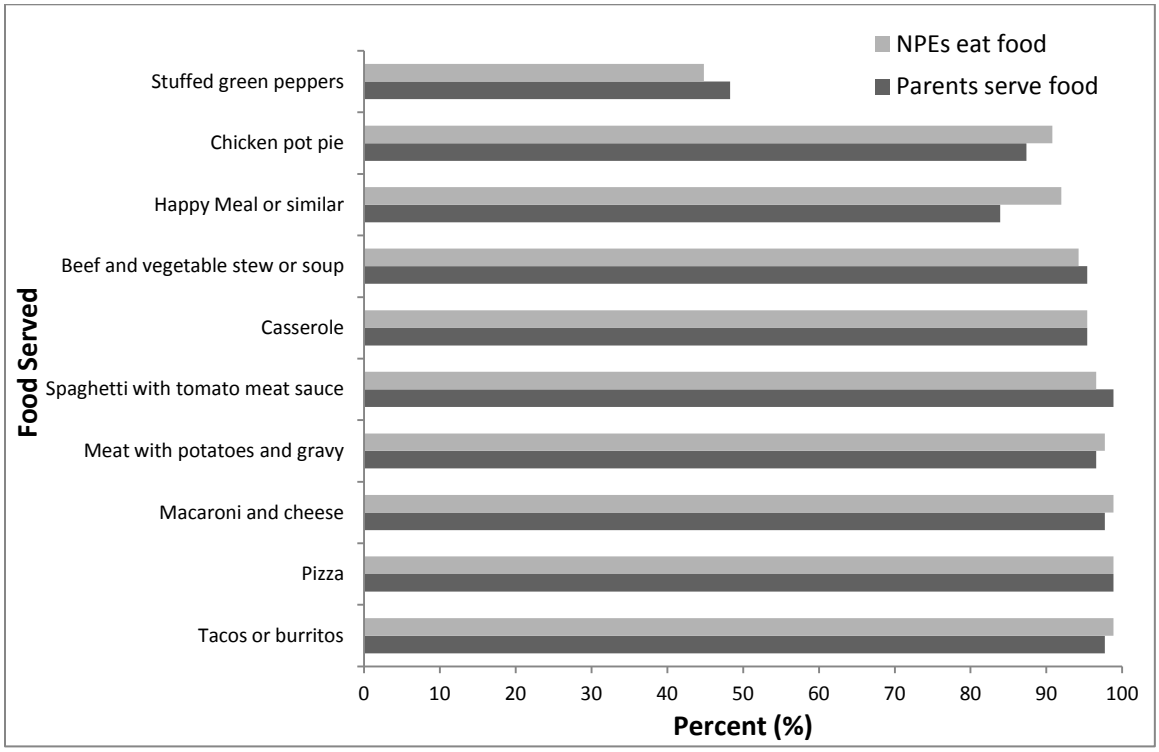
* Statistically significant as determined by Chi-Square ($p<0.05$)

Figure 3.19 MIXED DISHES served by parents of picky eaters (PE, n=83) and consumed by PE



* Statistically significant as determined by Chi-Square ($p<0.05$)

Figure 3.20 MIXED DISHES served by parents of non-picky eaters (NPE, n=88) and consumed by NPE



* Statistically significant as determined by Chi-Square ($p<0.05$)

CHAPTER 4
Picky Eating Perceptions According to Parenting Style: Qualitative Focus Group Research

4.1 Abstract

Picky eating is a widely reported problem associated with toddlers. One primary factor that influences picky eating is parents. As caregivers, they play a pivotal role in the development of their child's dietary preferences and their actions impact their child's behavior. Parenting style can affect how parents interact with their child and may even alter food acceptance patterns in toddlers. This focus group study was conducted to investigate whether parenting style affects parent perceptions and attitudes about picky eating, their overall approach to mealtimes, and how they overcome difficulties such as picky eating. Parents of toddlers completed an online version of the Parenting Styles and Dimensions Questionnaire (PSDQ) and then were assigned to focus groups based on their parenting style. Eight focus groups were conducted: four authoritative (n=26), two authoritarian (n=12), and two permissive (n=14). Parents discussed their definition of picky eating, the factors that influence pickiness, and provided specific strategies they would recommend or that they use themselves to encourage child feeding. Results indicated similarities among parenting styles in regards to defining picky eating, the importance of family meals, and the factors that influence picky eating development. However, parents classified as authoritative used more positive mealtime strategies than parents with the other two parenting styles. Authoritative parents also reported a greater prevalence of non-picky eaters. The focus groups confirmed that although perceptions of picky eating are similar among parents, how parents interact with their children at mealtime is influenced by parenting style.

4.2 Introduction

Although numerous studies have explored the concept of picky eating, there is not a consistent definition of the term (Dovey et al., 2008; Kauer et al., 2002). Picky eaters have been described as eating a limited variety of foods, eating the same foods repeatedly, and having a fear of trying new foods, otherwise known as food neophobia (Carruth et al., 1998; Galloway, Lee, & Birch, 2003; Jacobi et al., 2008; Kauer et al., 2002).

How parents perceive picky eating is likely the primary factor influencing the variation in how picky eating is defined. Most often the information comes from parents through questionnaires, such as the Child Feeding Questionnaire or the Food Neophobia Scale (Birch et al., 2001; Pliner & Hobden, 1992). Although parental perceptions are inherently subjective (Kauer et al., 2002), the parent-child feeding bond begins in infancy, which makes the primary care provider a key source for information regarding their child's mealtime behaviors (Satter, 1990).

Parents play an integral role in shaping their child's dietary preferences (Cathey & Gaylord, 2004; Dovey et al., 2008; Savage et al., 2007). From the moment of conception, they decide how and what to feed their child and then continue to mold the feeding environment throughout the child's growth and development (Savage et al., 2007). Caregivers serve as the child's first role model for feeding. This includes not only modeling their own eating habits, but also through the foods that they choose to make available to their child (Birch, 1999; Nicklas et al., 2001; Savage et al., 2007). Additionally, the mealtime strategies that parents use to encourage feeding can have either a positive or negative effect on their child's mealtime behaviors. Using strategies such as behavioral modeling, constantly exposing their child to new foods, encouraging and supporting their child's feeding habits, or allowing their child to self-

regulate total intake can promote positive eating behaviors (Nicklas et al., 2001; Savage et al., 2007; Scaglioni et al., 2008; Stanek et al., 1990). On the other hand, parental strategies like controlling mealtimes, pressuring their child to eat, and restricting foods as a consequence for not eating, or using rewards when the child eats an unwanted food can have a negative impact on long term food acceptance and liking in the child (Birch, 1999; Fisher et al., 2002; Galloway et al., 2005).

Additional research has begun to correlate parenting styles to these positive and negative mealtime strategies. Authoritative parents have been shown to use a variety of positive strategies such as encouragement, providing a wide variety of foods, and providing a supportive feeding environment (Hubbs-Tait et al., 2008; Hughes et al., 2005). This style is also associated with increased food variety consumed by children, including a greater intake of fruits of vegetables (Kremers et al., 2003; Patrick et al., 2005). Authoritarian parenting has been linked to negative parent feeding strategies such as controlling mealtimes, pressuring the child to eat and restricting certain foods (Duke, Bryson, Hammer, & Agras, 2004; Hubbs-Tait et al., 2008; Hughes et al., 2005). This style is negatively associated with fruit and vegetable consumption within a variety of age groups (Kremers et al., 2003; Patrick et al., 2005). Less work has been done with the permissive parenting style; however, it is linked to parents who create an indulgent environment with inconsistent practices (Blissett & Haycraft, 2008). Permissive parenting has also been associated with restrictive feeding techniques which shows an overlap between permissive and authoritarian parenting when it comes to mealtimes (Blissett & Haycraft, 2008; Hubbs-Tait et al., 2008).

Focus groups provide an exploratory method for answering a research question and allow for the probing and reasoning behind a response (Betts, Baranowski, & Hoerr, 1996; Kruger &

Casey, 2009). No other study has used qualitative focus groups to investigate parents' opinions regarding picky eating based on parenting style. The aims of this study were to 1) identify what factors and behaviors describe a picky eater, 2) reveal strategies utilized by parents to facilitate child feeding, and 3) determine similarities and differences between picky eater perceptions according to authoritative, authoritarian and permissive parenting styles. We hypothesized that there are differences that exist during mealtime among the three styles of parenting. Not all parents approach mealtimes in the same manner and a key factor to understanding how to overcome mealtime difficulties will be deciphering these differences across different parenting styles.

4.3 Materials and Methods

Subjects

This study was approved by the Institutional Review Board at the University of Illinois at Urbana-Champaign. Participants were recruited from the Urbana-Champaign, Illinois area through university email listservs, an e-week faculty announcement, flyers distributed at the Child Development Laboratory on the University of Illinois campus, and a newspaper advertisement. Inclusion criterion required participants to be the parent of at least one child currently in the 2-5 year age range. The child could be a picky or non-picky eater based on parent's assessment. In total, there were 52 participants consisting of 46 females and 6 males. Complete demographics can be found in **Table 4.1**. Parents reported child's picky eating status at the beginning of the focus group session: 24 parents reported having a picky eater, 23 reported having a non-picky eater, and 5 were undecided due to their child eating well within a certain range of foods (**Table 4.2**).

Procedures

Assessing Parenting Style

In order to separately assess the viewpoints and attitudes of different parenting styles, each parent completed an online version of the Parenting Styles and Dimensions Questionnaire (PSDQ, Appendix B) (Robinson, Mandleco, Olsen, & Hart, 2001). All participants agreed to an online research consent form prior to beginning the assessment (Appendix C). This 32-item survey examines behaviors parents may exhibit towards their child and records the frequency of each behavior on a 5-point scale (1=never, 2=once in a while, 3=about half of the time, 4=very often, 5=always). Out of the 32 items, 15 relate to authoritative parenting style, 12 relate to authoritarian parenting style, and 5 relate to permissive parenting style. Results for each parenting construct were averaged for each parent revealing three parenting style means. A cluster analysis was conducted on the means to group together parents with similar parenting styles. There were 26 parents who clustered as authoritative who were split into four focus group sessions of 6, 6, 7 and 7 people each. Twelve parents clustered with stronger authoritarian characteristics and were divided into two groups of 6. There were 14 permissive parents split into two groups of 7.

Focus Groups

All eight groups were led by the same moderator who had experience and training in focus group moderation. Additionally, a note taker was present at all groups. The moderator had facilitated previous focus groups on picky eating and was briefed on the concepts of parenting style and the influence of parents on child mealtime behaviors. Sessions lasted for 1.5 hours and the same discussion guide (**Fig. 4.1**) was followed each time. To document the

discussions, all groups were recorded using an audio recorder. All parents signed a hard-copy consent form (Appendix D) at the beginning of the focus group asking for participation consent and informing them of the audio recorder.

Each group started out with an introduction by the moderator. The script covered the purpose of the focus groups, introduced topics to be discussed, and provided ground rules for the session. Participants were encouraged to share their thoughts and opinions for each question but told they would not be forced to talk. Additionally, parents were asked to respect the comments of others and not to share information outside of the focus group. In order to get participants comfortable, each parent introduced themselves using their first name, said whether or not their child was picky, and briefly described mealtime in their home. Questions then moved on to the perceptions of the picky eating phenomenon in general by asking parents to describe their definition of picky eating, how it affects a child's growth and development, and what factors contribute to a child becoming picky. The discussion guide transitioned from what defines a picky eater to potential mealtime strategies that can be used to reduce the picky eating behaviors. Parents had the opportunity to share their opinions in how to overcome picky eating difficulties through offering new foods and mealtime strategies they use to encourage feeding. At the end of each focus group, parents completed an anonymous demographics questionnaire (Appendix E) and were given $25 cash as compensation for their time.

Data Analysis

Audio recordings of each focus group were transcribed verbatim by researchers. One primary researcher and three research assistants read and analyzed all of the transcripts. Analysis was conducted via the "long-table approach" as described by Krueger and Casey (2000).

Transcripts were printed and each comment was cut out and categorized according to which question it answered. This organized and broke down the information in order to ease analysis. Then, the comments for each question were summarized into themes and subthemes based on keywords and the frequency of similar responses. Themes were reviewed for the eight groups as a whole, as well as for each parenting style. Results for parenting styles were then compared for common themes and differences. In addition to manual analysis, NVivo9 software was used as a means of secondary analysis to support themes found by researchers and to assist in quantifying results. Both results from the long-table analysis and the NVivo analysis were used in discussing the findings. Differences in the number of picky eaters (PE) and non-picky eaters (NPE) between each parenting style were calculated with Pearson's Chi Square test.

4.4 Results and Discussion

Across all eight groups, it was apparent that each participant had their own individual encounters with picky and non-picky eating that served as the foundation for their comments and concerns regarding mealtime behaviors. Although the focus was on children aged 2-5 years, parents described experiences with children ranging from infants to teenagers from which they formed their opinions and beliefs. There were number of similarities within the three parenting styles, including the definition of picky eating, family mealtime dynamics, development of picky eating behaviors, and a few commonly recommended strategies for overcoming difficult behaviors. However, there were also differences across authoritative, authoritarian, and permissive parents regarding the prevalence of picky eating and viewpoints as to how parents should approach the issue.

Similarities Among Parenting Styles

Definition of Picky Eating

The literature has made a distinction between the terms "food neophobia" and "picky eating" with the former being rejection and avoidance of novel foods, while the latter is rejection and avoidance of familiar foods (Dovey et al., 2008; Galloway et al., 2003; Potts & Wardle, 1998). Food neophobia has become part of the concept of a picky eater along with other trademark behaviors such as eating a limited variety of foods and having specific food preferences (Carruth et al., 1998; Dovey et al., 2008, Jacobi et al., 2008). Despite these common themes, there is a lack of an operational definition of a "picky eater" that is consistently utilized in scientific research (Dovey et al., 2008, Kauer et al., 2002).

Yet, focus group participants brought up the same ideas about what constitutes being picky including: 1) only eats certain foods, 2) has specific preferences related to taste, texture, color, and/or presentation, and 3) will avoid any new and unwanted foods at all costs. Even though previous studies report an inconsistent definition for picky eating, parents in our focus groups were in agreement as to how they define the concept. The variation only appeared in the description of what behaviors are exhibited by picky eaters. While one child might display pickiness passively by not opening their mouth and refusing to eat, another may actively throw a tantrum and fight with their parent about what is served at a meal. These and other behaviors such as playing with their food, being distracted by something other than the meal, and refusing whole categories of food, such as vegetables, were described by parents in all eight focus groups.

Although half of the parents classified their child as non-picky, only one parent indicated that they never experience mealtime difficulties with their child. Even those parents who do not report problems feeding their child still struggled getting their child to focus on eating. A

common behavior mentioned by 11 parents was that their child gets easily distracted (**Table 4.3**). The concept of distraction has not been addressed in picky eating research and it may be more representative of either a behavioral or developmental issue rather than pickiness. Parents can see that their children are often more interested in playtime than mealtime, which is an inherent characteristic of toddlers (Yawkley & Silvern, 1977). It may be possible to overcome this issue by minimizing distractions (Cathey & Gaylord, 2004).

Family Mealtime Dynamics

Another common theme across all parenting styles was a strong attempt to have family mealtimes at least once or twice a week, if not every day. Eating meals as a family has been linked to a variety of positive outcomes in children, such as improved academic performance and a lower prevalence of risk-taking behaviors and behavior problems (Fiese & Schwartz, 2008). The practice can also promote the development of healthy food choices, as evidenced by a greater intake of fruits and vegetables in families that share meals (Mogharreban, 1996; Videon & Manning, 2003). Participants were supportive of at least one parent eating meals with their children whether it is at breakfast, lunch, and/or dinner. Those who indicated they did not eat meals together as frequently as they would like noted that this was due to a misalignment of parent and child hunger schedules or a parent working late, which prevents everybody from being together. There was no trend between parenting styles regarding the frequency of family meals, implying that authoritative, authoritarian and permissive parents are equally aware of the benefits family mealtime can provide.

The majority of parents indicated that dinner as the most difficult meal of the day. During the discussion, parents were asked to describe difficulties they encounter with their

children at mealtime (Questions 3.2.b, **Fig 4.1**). The intent of this question was not to specify which meal is the most challenging; however, 24 of the 52 parents included a statement that "dinner is the hardest" or "dinner is the most challenging" in their response (**Table 4.3**). Those who did not specifically mention that dinner is the hardest meal of the day often referred to the evening meal to describe the difficulties they encounter with their child. For example, one parent was describing what happens when they eat dinner together and mentioned that "getting food into their daughter's mouth is a struggle." Referring to dinner time as troublesome occurred within all three parenting styles and was mentioned by both parents of picky and non-picky eaters.

Development of Picky Eating

When asked what factors contribute to the development of picky eating (Question 3.1.e, **Fig. 4.1**), parents were in agreement that there are four main influences: environment, peers, genetics, and parents. At least one factor from each of these categories was mentioned in all eight focus groups, demonstrating that there is no singular cause for picky eating. Also, there were a variety of responses in each category, inferring that each picky eater develops through their own individual set of influences. A major effect appears to come from environmental exposure. Parents mentioned the impact of the home, school, daycare, or media on the development of picky eating in 22 different comments (**Table 4.3**). The food a child is surrounded by and what others around them consume impacts their dietary decisions. Mere exposure to food can increase liking; therefore, it is critical to account for what foods picky eaters have contact with (Birch & Marlin, 1982).

Peer influence is also a component of the environment, because toddlers are surrounded by other children their age in daycare and preschool settings. Eighteen comments by parents expressed how friends and classmates influence their child's mealtime habits and behaviors (**Table 4.3**). One parent described it as: "monkey see, monkey do—somebody else doesn't like a food, then without trying it, my daughter doesn't like it either." Dovey and colleagues (2008) highlighted the social influence that peers have on the intake of healthy foods. If someone, especially a friend, models that they do not like something, it can cause others to show dislike as well. Comments from the focus group parents, such as their child changing their mind about something previously liked, or their child eating something at their friend's house that they will not eat at home, support the concept that peer influence on picky eating is undeniable.

There is also a genetic component to picky eating. Cooke and colleagues (2007) established that there is a heritability component to food neophobia, even if environment plays a role as well. Multiple parents referenced differences in feeding habits within their own household; while one child eats everything, another will not touch certain foods. "From my experience, it's not just parenting because I have two sons who I've treated exactly the same and one is picky while the other is not," explained one parent. According to the parents, these differences lay within personality, innate taste preferences, and liking or disliking of certain textures, which were mentioned within the 28 comments related to genetics (**Table 4.3**). The impact of child's personality on mealtime may be related to basic child development and the desire for autonomy. As children grow and begin to learn to do things for themselves, toddlers often exhibit noncompliance with parental requests (Crockenberg & Litman, 1990; Kuczynski et al., 1987). In the context of feeding, Johnson (2002) describes the rejection of foods as part of

the "terrible twos." Some parents share this viewpoint that not wanting to try new foods is just part of being a toddler—"Toddlers are just picky eaters."

Parents also understand that they play a role in their child's dietary development. Across all focus groups, there were 32 comments regarding the strong influence parenting styles and parental actions have on their child's food selection and mealtime behaviors (**Table 4.3**). This influence is actualized by what the parent eats, what foods are brought into the home, what foods are served to their child, and how the parent interacts with their child. "How the parents act and react" can create either a positive or negative mealtime experience. This concept was discussed at other points in the focus group when parents were asked if they thought picky eating was a "stage" or long term issue and how to solve the problem of picky eating (Question 3.1.c and 3.2.a, **Fig. 4.1**). Parents see their actions as something that can either help or hinder troublesome mealtime behaviors. They have control over what is brought into the home and "parents influence what their children eat." A few parents in the authoritative and permissive groups noted that trying to force a picky eater creates a battle that makes things worse. However, it should be kept in mind that some parents can still experience difficulties no matter how they react to their child's feeding issues. It was reported by Sanders and others (1993) that parents who experience more feeding problems are more likely to use coercive feeding techniques; therefore, it can be a challenge for parents of picky eaters to respond to their child's behaviors in a positive manner.

Common Parent Strategies

One of the most common mealtime strategies employed by participants is to frequently and consistently offering new foods to their child. Phrases like, "Try, try again", "Introduce new

foods all the time", "Continue to throw things out there and see what sticks", and "We don't stop trying—the food always goes on your plate" appeared in every group from almost every parent. Parents were asked on average how many times they offer a food to their child (Question 3.3.a.1, **Fig. 4.1**); however, parents did not provide exact numbers as to how many times they offer a food because the majority responses indicated that parents don't set a number of times and continuously offer foods. Out of 52 parents, only five indicated that they give up on a food and stop offering it if their child showed dislike for that item (**Table 4.3**). The majority were firm in their attempts to either introduce new foods or serve the same foods again and again with the hope their child will become accepting. Overall, parents were aware of the fact that repeated exposure can increase liking of a food, which has been demonstrated by multiple studies (Birch & Marlin, 1982; Cooke et al., 2007; Wardle et al., 2003).

Differences Across Parenting Styles

Despite common themes that appeared across all eight sessions, dissimilarities emerged among the different parenting style groups. One major difference was the degree of picky eating experienced by each style, with authoritarian and permissive parents reporting more picky eaters. Additionally, differences in parent mealtime strategies and the general tone of the groups were detected among authoritative, authoritarian, and permissive parents.

Authoritative Parenting Style

Out of the 26 parents that were classified under the authoritative parenting style, 7 labeled their child as picky, 14 as non-picky, and 5 were undecided. Those who had difficulties labeling their child as picky or non-picky indicated that their child was a good eater within a

certain range of foods, or that the child would eat uncommon foods like tofu, but would not touch a common food like cheese. It may be that the undecided parents are less likely to categorize their child as PE or NPE and are more accepting of their child's behaviors. Among the 21 children who were classified by the parents, 33% were PE and 67% were NPE (**Table 4.2**). This was the highest percentage of non-picky children reported by a parenting style group and a one-way Chi Square for pickiness within all parenting styles revealed that the count of NPE from authoritative parents was significantly higher than from permissive parents ($p=0.02$).

Collectively, the authoritative parents emphasized positivity and patience as important mealtime factors. These terms were used 10 times within the four authoritative parents groups as parents discussed having a "positive attitude to help their child build a good relationship with food" and that "parents need to be patient and focus on the positive side" (**Table 4.4**). Authoritative parents also appeared to have a solid understanding of the need to balance control during the meal. As one parent put it "kids want control of their lives, so in this case, they want control over their food." This follows Erikson's Stages of Psychosocial Development and the desire for autonomy that begins around two years of age (Erikson, 1950, 1959). To compensate for their toddler's desire for independence, thirteen parents said that they give some mealtime control to the child (**Table 4.4**); however, this does not necessarily mean giving in to picky requests. By setting boundaries regarding what is served and encouraging them to try it, the parent remains in charge. Then they can relinquish some control by letting the child decide what is eaten and how much, as recommended by Cathey & Gaylord (2004).

When it comes to mealtime strategies (Question 3.3.b, **Fig. 4.1**), authoritative parents did not comment as frequently about forcing their child to eat, using restrictions, or using rewards for eating, compared to authoritarian and permissive parents (**Table 4.4**). Even though the child

may be asked to try a bite, as a whole, authoritative parents were not proponents of force feeding when faced with mealtime difficulties. "We try not to force him, because he has such a positive experience at mealtime." Pressure to eat has been linked to a decrease food acceptance (Birch & Fisher, 1998). Eight authoritative parents said that they do not want to use force when feeding their child (**Table 4.4**). Instead, parents were focused on teaching their child about the food that is being served as well as involving them in the meal preparation. Authoritative parents also found the practice of parents modeling consumption to be important. Nine people suggested modeling as a strategy parents should employ with their children (**Table 4.4**). Food acceptance is partly a learned behavior and by demonstrating consumption, parents can encourage liking (Birch & Fisher, 1998). Additionally, it was mentioned seven times by authoritative parents that they attempt to make mealtime fun for their child through eating games, novel food presentation, and engaging conversation (**Table 4.4**).

Authoritarian

There were 12 parents within the authoritarian parenting style focus groups. Overall, 7 parents reported their child as picky, while 5 said non-picky. This breakdown of 58% PE and 41% NPE indicates a higher prevalence of picky eaters compared to the authoritative parents (**Table 4.2**). Even though the numbers show an increase in prevalence of picky eaters, a two-way Chi Square indicated that there was no significant difference in the reported picky eating status between authoritative and authoritarian parents.

In general, the authoritarian parents are better characterized not by what they said, but by what they did not say. The themes of positivity and patience seen within the authoritative parents were not apparent within the authoritarian parents because these words did not come up

once in either group (**Table 4.4**). Also, with such an emphasis from the authoritative parents on balancing parent and child control, it was a contrast to not hear this mentioned at all by authoritarian parents inferring that this is not a concept they are as concerned about in feeding. Instead, a different strategy of using incentives and bribery with favorite toys or foods was discussed by five parents in the authoritarian parenting style (**Table 4.4**). When asked what strategies should be utilized to overcome mealtime difficulties (Question 3.3.b), one parent said "Give incentives. For example: You will get to have dessert if you eat this vegetable." However, using a reward for good eating can actually decrease a child's preference for the unwanted food (Birch et al., 1982; Birch et al., 1984).

Not all authoritarian parent practices were negative. Seven parents brought up the importance of involving the child in the food preparation and meal choice (**Table 4.4**). Engagement of children in the selection and preparation of foods in the home improves diet quality in children and adolescents (Gross et al., 2010; Larson, Perry, Story, & Neumark-Sztainer, 2006); therefore, it may be beneficial to engage children with meal preparation as their motor skills develop and they can help in the kitchen. Still, authoritarian parents did not talk about the beneficial practices of making the meal fun and parental modeling, which were frequent comments in the authoritative groups (**Table 4.4**).

Permissive

Of the 14 parents in the two permissive parenting style focus groups, 10 labeled their child as picky and 4 said they were non-picky. This is a greater proportion that both the authoritative and authoritarian parents with 71% PE and 29% NPE reported by permissive parents (**Table 4.2**). A two-way Chi Square revealed that the difference between picky status

across parenting styles was close to significant (p=0.07). Although a one-way Chi Square for PE status within each parenting style was not significant (p=0.68), permissive parents in this sample had a higher prevalence of PE.

There were two major themes that occurred within the permissive parenting style groups that aligned with authoritative parents. First of all, they were adamant about not using force during mealtimes, which was discussed by 10 of the 14 permissive parents (**Table 4.4**). "If we do not force our child to eat, they are willing to try new things. If we do force our child to eat, then they will be under pressure and not want to try new things." This is in line with the authoritative parents who also did not want to utilize force feeding. Secondly, permissive parents frequently mentioned the concept of their children wanting control. Thirteen comments addressed parents' experiences with their child seeking control including: "He wants control over his meal", "A child may not control their food preparation, but they can control what goes into their mouths", and "Even if I get her to try something new and she likes it, she still doesn't want to give up control—I like it, but I don't want to eat it" (**Table 4.4**). It is important to note the difference between authoritative and permissive parents bringing up the concept of balancing parent-child control. While authoritative parents recognized that they need to give their child some control in order to alleviate mealtime struggles, permissive parent were less concerned about giving up control and more focused on the idea that their child was trying to take control from them.

Permissive parents also had some similarities when compared to the authoritarian groups. Multiple parents said that they use bribery or incentives as a mealtime strategy and suggested this as a way for other parents to overcome picky eating (Question 3.3.b.1, **Fig. 4.1**). Also,

permissive parents did not talk about any teaching methods and only two parents said that they make the meal fun to get their child interested in the food being served (**Table 4.4**).

One concept that was unique to the permissive parenting groups was the idea that picky eating is a learned behavior. This was not mentioned in the authoritative or authoritarian groups; yet permissive parents brought it up 12 times across the two groups (**Table 4.4**). They believe that their children have learned what to like and dislike from watching their friends, they have figured out what they can and cannot get away with at home, and they are discovering their dietary independence through personal development. It has been well documented that environment, both home and peer influences, plays a significant role in food preferences (Birch, 1980; Birch, 1999; Dovey et al., 2008); however, for a group that understands that their children learn their actions from others, nobody in the permissive group mentioned parent modeling of consumption or setting an example of good eating habits.

4.5 Conclusions

The results of the focus group analysis showed that there were similarities in the way parents perceive picky eating, but their experiences with mealtime difficulties were not all the same. Parents believed that there was a common definition for most picky eaters; however, the expression of picky behaviors changed on an individual basis. The separation of parents into focus groups by parenting styles allowed for an in-depth qualitative analysis that had not yet been explored. Even though there was overlap among the authoritative, authoritarian, and permissive parents regarding their views on family mealtime, it was obvious that distinct qualities from each style began to emerge. The authoritative parents showed qualities that may promote positive parent-child interactions during meals, which is supported by the higher

prevalence of non-picky eaters reported. Their understanding of how to react to pickiness could be a key part of helping other parents overcome the stress of mealtime difficulties and fostering healthy eating in children. Authoritarian parents, while not completely negative, appeared to use less of the positive strategies employed by authoritative parents. In general, they may be lacking the support children need to develop good eating habits. Permissive parents seemed to have parallel practices to both authoritative and authoritarian parents. Their good intentions were lost in the frustrations of having the highest number of picky eaters. Ultimately, the information from these groups provides a foundation for how parenting styles impact picky eating differently. Further investigation is needed to confirm any relationships between specific parenting styles, parenting strategies, and the prevalence of picky eating.

4.6 Tables and Figures

Table 4.1 Demographic profile of parent participants

		Total (N=52)	
		Count	**%**
Gender:			
	Female	46	88.5
	Male	6	11.5
Age:			
	18-25	4	7.7
	26-35	25	48.1
	36-45	22	42.3
	46-55	1	1.9
Marital Status:			
	Single	5	9.6
	Married	47	90.4
Race:			
	African American	5	9.6
	Asian	6	11.5
	Caucasian	38	73.2
	Hispanic	2	3.8
	Prefer not to say	1	1.9
Education:			
	Some college	4	7.7
	Bachelor's degree	18	34.6
	Graduate degree	30	57.7
University Affiliation			
	Faculty	3	5.8
	Student	8	15.4
	Staff	20	38.4
	Not Related	21	40.4
Income			
	<25,000	5	9.6
	25,000-34,999	10	19.2
	35,000-49,999	3	5.8
	50,000-74,999	14	26.9
	75,000-99,999	9	17.3
	>100,000	8	15.4
	Prefer not to say	3	5.8

Table 4.2 Categorization of PE or NPE status according to parenting style.

	Parenting Style (N=47)			
Status	**Authoritative**	**Authoritarian**	**Permissive**	***Total***
Picky (%)	7 (33)	7 (58)	10 (71)	***24 (46)***
Non-picky (%)	14 (67)	5 (41)	4 (29)	***23 (44)***

Percentage of PE and NPE for each parenting style expressed in parenthesis
Two-way Chi Square for PE and NPE status within all parenting styles p value = 0.07
One-way Chi Square for PE status within all parenting styles p value = 0.68
One-way Chi Square for NPE status within all parenting styles p value = 0.02

Table 4.3 Frequency of comments found among all parenting style groups

COMMENT	**Total (N=52)**			
	Authoritative	**Authoritarian**	**Permissive**	***Total***
Child gets distracted during meals	4	3	4	***11***
Dinner is the hardest meal	10	10	4	***24***
Environment influences the child	7	7	8	***22***
Peers influence the child	5	6	7	***18***
Genetics/personality influence preference	11	12	5	***28***
Parenting influences the child	14	9	9	***32***
Parents give up offering new foods	1	1	3	***5***

Table 4.4 Frequency of comments that differed among parenting styles

COMMENT	**Total (N=52)**		
	Authoritative	**Authoritarian**	**Permissive**
Be positive about meals	8	0	5
Use patience during meals	2	0	0
Balance of parent-child control	13	0	13
Use rewards or incentives	1	5	7
Do not force child to eat	8	1	10
Model consumption to child	9	0	0
Make the meal fun	7	0	2
Involve child in meal preparation	8	7	2
Teach child about food served	4	0	0
Picky eating is a learned behavior	0	0	12

Figure 4.1 Parent focus group discussion guideline

1. *INTRODUCTION*

1.1 Moderator's introduction

a. General purpose and procedures of a focus group

b. Role of the moderator

1.2 Objective of this focus group

1.3 Ground rules

a. State first name each time one speaks, confidentiality

b. Free to participate or not participate at any time

c. One person talking at a time

d. Respect others' opinions

1.4 Taping of the focus group

2. *WARM UP* "To get acquainted and get us all thinking about the topic of interest, please…"

2.1 State your first name

2.2 Briefly describe mealtime in your family and any behaviors exhibited by you or your child

3. *PROBING QUESTIONS*

3.1 <u>Introductory questions</u>: Parental perceptions of the picky eating phenomenon

a. Describe your definition of a picky eater. Feel free to give examples from your experiences.

b. What behaviors do you associate with a picky eater?

c. How does picky eating relate to a child's development? Is it a common "stage" that a child eventually grows out of or is it a longer term issue?

d. How does picky eating affect a child's growth and maturation?

e. What factors do you think contribute to the development of picky eating?

3.2 <u>Transition questions</u>: Perceiving picky eating as a problem

a. Do you believe that there is a way to solve picky eating?

1. If so, what can parents do to solve the problem?
2. If not, what factors would hinder a successful solution?

b. What difficulties do you encounter with your own child at mealtime?

3.3 <u>Key questions</u>: Parents trying to overcome the problem of picky eating

a. Offering new foods

1. On average, how many times do you offer a new food to your child?
2. Once deciding your child does not like a food, do you continue to offer it?
3. Please give any examples from when your child has changed their mind about the liking or disliking of a specific food.

b. Using strategies

1. What strategies should a parent use if their child does not eat the meal that is served?
   i. Which actions do you think would be most effective in influencing the child?
2. What strategies have you used with your own children to overcome difficulties at mealtime?
3. How does the use of mealtime strategies affect your child's behavior?

4. *CLOSURE*

4.1 Wrap up

a. Before wrapping up, are there any other questions or comments regarding picky eating that you may have? Any other mealtime strategies you would like to discuss?

b. Thank you for your time.

c. Distribute incentive.

CHAPTER 5
The Correlation Between Parenting Styles, Feeding Strategies, and the Mealtime Behaviors of Picky and Non-Picky Children

5.1 Abstract

Parents are influential regarding their toddlers' diet and mealtime behaviors. This is an important time and many children develop the common mealtime issue of picky eating during toddlerhood. The foods parents serve and the methods they use in feeding all shape the establishment of their child's food preferences. Mealtime strategies parents use differ from one parenting style to another, but no connection had been made between parental strategies and child behaviors associated with picky and non-picky eaters. The objectives of this study were to further elucidate the relationship between parent and child mealtime behaviors and uncover any correlations existing between picky eating and parenting style. A total of 525 parents completed two surveys: 1) the Mealtime Assessment Survey assessing the frequency of parent and child mealtime behaviors and 2) the Parenting Styles and Dimensions Questionnaire that measures authoritative, authoritarian, and permissive parenting styles. Spearman's correlation analysis was conducted to calculate relationships between parenting styles and mealtime behaviors. Results revealed positive correlations between authoritative parenting and both non-picky child behaviors, as well as parent mealtime strategies that promote positive eating habits. Authoritarian and permissive parenting styles were positively correlated to child behaviors associated with picky eating and parent mealtime strategies that can negatively influence child feeding. These findings show the different impacts of three main parenting styles and indicate that the way parents approach feeding can either exacerbate or discourage picky behaviors.

5.2 Introduction

When studying diet development in children, there has been a particular focus on the toddler years when food preferences are becoming established. During this critical stage of development, children are forming eating patterns that will serve as the foundation for lifelong habits (Birch & Fisher, 1998; Mascola et al., 2010). Encouraging healthy eating practices in their children becomes difficult for some parents who experience the feeding problem known as "picky eating". As many as 50% of parents encounter pickiness by the time their child is two years old, which includes behaviors such as eating an inadequate variety of foods, consuming the same foods repeatedly, and being unwilling to try new foods (Carruth & Skinner, 2000; Carruth et al., 2004; Cathey & Gaylord, 2004). Many picky eaters share a similar dietary profile that is characterized by avoidance of foods high in vitamins, minerals, and other essential nutrients, such as fruits, vegetables, and sources of protein, including meat (Carruth et al., 2004; Mayeaux-Boquin, 2010). Often between the ages of 18 months and 2 years, children who were characterized as "good eaters" will begin to reject new foods and stop eating foods with which they were already familiar (Johnson, 2002). This behavioral change leaves parents frustrated and worried about their child's nutritional status and may alter the way parents interact with their child during mealtime. However, parents may engage in behaviors with the goal of encouraging proper eating that will actually have the opposite effect (Birch, 1999; Carruth et al., 1998; Reed, 1996; Savage et al., 2007).

Parents play a powerful role in influencing a toddler's dietary choices, because they are the gatekeepers of food into the home and serve as one of their child's first role models. As the head of the home, parents choose what food to purchase, what to serve to their children, and also demonstrate their own food preferences to their children. (Anzman, Rollins, & Birch, 2010;

Cathey & Gaylord, 200; Savage et al., 2007). Parents who make a wide variety of foods available in the home can improve their child's intake and promote the consumption of commonly-avoided foods, such as fruits and vegetables (Birch & Marlin, 1982a; Cooke, 2007). With the intent to influence their child's diets and overcome the difficulties of picky eating, parents may employ mealtime strategies to encourage child feeding; yet, while some parent strategies positively affect the child, others can negatively impact child behaviors (Cathey & Gaylord, 2004; Moore et al., 2007; Scaglioni et al., 2008). In addition to providing a large variety of foods in the home, parents can broaden their child's food choices through repeatedly exposing their child to novel foods, encouraging their child to try a bite of the food, and modeling healthy food intake. These practices support the long term acceptance of new foods and decrease struggles during mealtimes (Birch & Marlin, 1982a; Birch et al., 1987b; Cullen et al., 2001; Fisher et al., 2002; Galloway et al., 2005; Patrick & Nicklas, 2005).

In contrast, the mealtime practices of controlling their child's intake, pressuring consumption, restricting certain foods, and using rewards in exchange for eating healthy foods, have a negative effect on a child's dietary preferences (Birch et al., 1987a; Birch et al., 1982b; Fisher & Birch, 1999b; Fisher & Birch, 2000). As a result, children do not listen to their internal regulatory cues of hunger, over-eat restricted foods when they become available, and learn to dislike the foods they have to consume in order to get a reward (Fisher & Birch, 1999a; Galloway et al., 2005; Orrell-Valente et al., 2007). Parents of picky eaters (PE) often employ a wider range of mealtime strategies than do parents of NPE due to concerns and frustration, which can increase the prevalence of coercive and harmful techniques (Jacobi et al., 2008; Pelchat, & Pliner, 1986; Sanders et al., 1993).

Research has shown a connection between authoritative, authoritarian and permissive parenting styles with certain parent mealtime practices. Authoritative parenting is linked to optimal child development and is characterized by setting boundaries for the child, while providing high levels of warmth (Baumrind, 1966; Mannatah, 2005). Parents who are authoritative use encouragement, create a balance of parenting control with child autonomy during meals, model healthy food consumption, and provide a large variety of fruits and vegetables in the home (Hubbs-Tait et al., 2008; Hughes et al., 2005; Iannotti et al., 1994; Patrick & Nicklas, 2005). Authoritarian parenting is typified by parents who also set child boundaries, but do so with lower levels of warmth (Baumrind, 1966). This style has been linked to a variety of negative feeding strategies such as mealtime control, pressure to eat, food restriction, rewards for eating and low fruit and vegetable availability in the home (Hubbs-Tait et al., 2008; Patrick & Nicklas, 2005; Patrick et al., 2005; Wardle et al., 2005). Permissive parenting is defined by a lack of boundaries set by parents with high levels of warmth given to the child (Baumrind, 1966). During mealtimes, permissive parents are more lenient, often provide rewards for eating, and this parenting style is negatively correlated to modeling food intake (Hubbs-Tait et al., 2008; Patrick & Nicklas, 2005; Rhee et al., 2006).

The relationship between these three parenting styles and parent mealtime strategies is well established. There is also a robust amount of research that supports the influence various mealtime strategies can have on a child's dietary choices and mealtime behavior. What is currently unknown is whether authoritative, authoritarian, and permissive parenting can impact either PE or non-picky eater (NPE) behaviors in toddlers. There may be a cause and effect relationship between child behavior and parent behavior which brings up the question: Do strategies employed by parents with different parenting style exacerbate PE behaviors in the

child – or in other words, do parents create the problem that they are trying to solve? The purpose of this study was to further our understanding of the role parents play in their child's dietary choices and mealtime behavior. Our objective was to assess the relationship between parenting styles, parent mealtime strategies, and PE and NPE child behaviors through correlation analysis. We hypothesized that parenting style influences parental perceptions of picky eating and has an impact on how both parents and children act during mealtimes.

5.3 Materials and Methods

Procedures

This study was approved by the Institutional Review Board at the University of Illinois. Parents were recruited through the Innovative Consumer Research Center (ICR) located in Grand Rapids, MI. A recruitment email containing an online survey link was sent to registrants in the ICR database. In order to participate, parents had to have at least one child in the 2-5 year age range, be willing to complete a survey about mealtime behaviors and parenting styles and have access to the internet. Only one parent per household was asked to complete the survey and their child could be either a PE or NPE. An online block limiting one completion per internet IP address was put in place to restrict responses to one per household. The online survey was launched through the Survey Gizmo website (www.surveygizmo.com). Upon opening the link provided in the recruitment email, participants were greeted by a welcome screen and online consent form (Appendix F). By indicating that they read and understood the terms and conditions of the study, parents agreed to voluntarily participate and enter the survey. At any time, parents had the option to quit the survey before completion and their responses would not be recorded. After completing the survey, parents were entered into a drawing to win one of the

following gift cards: 15 $20 gift cards, 2 $50 gift cards, or 1 $100 gift card. Gift cards were purchased at Target and distributed to drawing winners by the ICR.

Survey Participants

A total of 572 parents started the survey and 525 parents completed the questions and were used in analysis for a dropout rate of 8%. At the end of the survey, participants filled out demographics questions about gender, age, marriage status, ethnicity, and number of children (Appendix G). Out of 525, 500 parents were female, 383 (73%) were between the ages of 26 and 35 years, 497 (95%) were married and 492 (94%) were Caucasian. Also, only 14% (72) of parents had an only child, indicating most parents had more than one child with the majority of 82% (428 parents) having 2 to 4 children. Complete demographic information is in **Table 5.1**.

Survey Measures

The online questionnaire was developed from two existing surveys. First was the Mealtime Assessment Survey (MAS, Appendix H) developed by Mayeaux-Boquin (2010). The MAS contains a list of 43 child behaviors and 25 parent strategies that may be exhibited during mealtime. Behaviors were developed from previous work on picky eating, as well as other existing questionnaires on child mealtime behaviors (Mayeaux-Boquin, 2010). The 43 child behaviors consisted of actions characteristic of both PE and NPE before and during mealtimes. The final item for child behaviors asked if the child is a PE. Parents rated each behavior on a 5-point scale indicating how frequently they experience each behavior with 1=Never, 2=Rarely, 3=Sometimes, 4=Often, or 5=Always. The MAS also contained 25 strategies parents might utilize to encourage their child to eat during mealtimes, including behaviors that could have

either positive or negative effects. Parents specified how frequently they utilized each strategy with their child on the same 5-point scale.

The second part of the online questionnaire was the Parenting Styles and Dimensions Questionnaire (PSDQ, Appendix B). Originally, the instrument contained 62 items; however, a valid and reliable shortened version with 32 items had been developed to assess parenting style (Robinson et al., 2001). Each of the 32 questions on the PSDQ states a behavior parents may exhibit towards their child during daily interactions as a reflection of one of three parenting styles: Authoritative Parenting (15 questions); Authoritarian Parenting (12 questions) or Permissive Parenting (5 questions). . Responses are based on frequency and are measured on a 5-point scale with 1=Never, 2=Once in a while, 3=About half of the time, 4=Very often, and 5=Always. The internal consistency of the original 32-item PSDQ among parenting style constructs was shown through Cronbach's α scores of 0.86 for authoritative, 0.84 for authoritarian and 0.64 for permissive (Robinson et al., 2001). In our use of the tool, Cronbach's α scores were 0.83 for authoritative, 0.72 for authoritarian and 0.64 for permissive. The lower score for the permissive parenting style may be explained by the fewer number of items in the subscale compared to the other two parenting styles (Peterson, 1994).

Analyses

Statistics

Survey results were exported into Microsoft Excel from the Survey Gizmo website. All data were analyzed with XLSTAT (Version 2012, Addinsoft USA, New York, NY). Survey options were presented to parents as word scores (Never, Rarely, Sometimes, Often, and Always) and the numeric values of 1-5 were assigned post hoc for analysis. Therefore, data were

considered as ordinal, because equal intervals cannot be assumed between the word anchors. Futhermore, results did not meet assumptions for the Pearson correlation test and the data could not be considered as continuous. To determine significant correlations between parenting styles and child mealtime behaviors, as well as between parenting styles and parent mealtime strategies, two-tailed Spearman correlation coefficients were calculated.

Interpretation

In order to further clarify correlation test results, the child mealtime behaviors from the MAS were divided into PE and NPE (**Table 5.2**), based on the results from previous work with the survey (Mayeaux-Boquin, 2010). Mayeaux-Boquin found that out of the 43 child behavior items, 23 were significantly associated with PE, 14 with NPE, and 5 had no significance according to Pearson's Chi-Square analysis or Fisher's Exact Test. This division of behaviors provides greater insight into the correlation results because it highlights the trend between each parenting style and both picky and non-picky eating behaviors.

Additionally, we categorized the parent mealtime strategies as having a positive, negative or neutral impact on child mealtime behavior (**Table 5.3**), based on the results of Mayeaux-Boquin's work, as well as other research studies. It has been well established that using praise, encouragement, child involvement in food preparation, parental modeling intake, as well as, providing some control over mealtime choices to the child, and making meals fun can foster good parent-child relationships during feeding and lead to an increased food adventurousness in children (Casey & Rozin, 1989; Cathey & Gaylord, 2004; Iannotti et al., 2001; Nicklas et al., 2001, Savage et al., 2007). Based on these findings, 8 of the 25 MAS strategies were classified as "positive." The strategies of offering rewards, restricting foods, controlling mealtime, and

pressuring or forcing consumption are widely accepted has having adverse effects on child behavior (Anzman et al., 2010; Birch, 1999; Forthun, 2008; Patrick & Nicklas, 2005; Savage et al., 2007; Scaglioni et al., 2008). Therefore, 9 of the 25 MAS parent strategies were classified as having a "negative" impact. The remaining 8 strategies were labeled as neutral because either there is not a strong connection between that strategy and a specific child behavior or because the strategy could be interpreted as positive or negative depending on the context. For example, the strategy "require your child to try a bit of each food on their plate" could be seen as encouraging the child to at least taste the food item before rejecting it (positive), or it could be construed as forcing the child to eat something they do not want (negative).

5.4 Results and Discussion

Between the child behaviors and parent strategies, specific trends emerged for the three parenting styles. Authoritative parenting was minimally correlated to PE behaviors and was strongly linked to a variety of positive parenting strategies. On the other hand, authoritarian and permissive parenting styles were correlated to PE behaviors, as well as to multiple negative parenting strategies. These results begin to define differences among the parenting styles in regards to mealtime interactions with children.

Authoritative Parenting

Child Behaviors

As seen in **Tables 5.4 and 5.5**, there were significant correlations between authoritative parenting and the various child mealtime behaviors. Out of the three parenting styles, authoritative was the only one that had positive correlations with behaviors associated with NPE,

including looking forward to mealtime, finishing their food, eating "healthy" foods, eating foods that are normally served raw and eating foods with different textures. This connection between authoritative parents and the consumption of healthy, raw foods such as fruits and vegetables supports previous findings. Patrick and others (2005) showed that in preschool-aged children, authoritative parenting was related to greater availability of fruits and vegetables in the home and higher child consumption of these foods. These results were also seen in an adolescent population (Kremers et al., 2003). In general, NPE eat a large assortment of foods, from fruits and vegetables to meat, dairy, and legumes (Carruth, 2004, Mayeaux-Boquin 2010). In our work, authoritative parenting was negatively correlated to children eating food of only one color, which further supports authoritative parenting promoting the consumption of a wider variety of foods.

Authoritative parents also have a significant positive relationship with children showing signs of sadness or disappointment when food is not prepared right, as well as taking a long time to finish a meal. Although these behaviors are associated with PE, the correlation to authoritative parenting was lower than what was seen with the NPE behaviors. Also, both of these behavioral items were positively correlated to all three parenting styles, not just authoritative, which may indicate that this reflects normal toddler behavior. Specifically, the behavior "takes a long time to finish a meal compared to the rest of the family" aligns with the fact that toddlers have not fully developed cognitively, have a short attention span, and get distracted easily, which could delay eating (Berk, 2008).

Parent strategies

Overall, authoritative parenting was largely associated with parent mealtime strategies that either have a positive or neutral impact on child behavior (**Table 5.6**). Authoritative

parenting was correlated to methods that lead to good child behaviors, such as teaching their child about the food served, providing praise and encouragement at the table, involving their child in meal preparation, giving their child a choice about what to eat and modeling consumption of healthy foods to their child. All of these methods create a more positive environment and allow children some control within the context of mealtime. Parents who use encouragement instead of discouragement and commend children for good eating habits foster successful eating patterns in their children (Iannotti et al., 1994).

Many of the behaviors that were correlated with authoritative parents have previously been related to positive child actions and the authoritative parenting style. For example, Hughes and others (2005) showed that authoritative parents are highly nurturing compared to authoritarian parents. We found that they are correlated with giving their child some control, such as having them help plan the meal or allowing them to choose what to eat from the foods served. These actions support child autonomy and may decrease parent-child struggles at the table (Cathey & Gaylord, 2004). Overall, these findings are in line with previous work on authoritative feeding, where the parents set the boundaries of what is served at the meal, but allow the child to choose what they will eat (Patrick & Nicklas, 2005). Results also showed a strong positive correlation with parent modeling, which was also seen in a study conducted by Hubbs-Tait and others (2008). This is a particularly beneficial strategy parents can use to overcome food neophobia because it provides observational learning for the child and teaches them that new foods are safe (Birch & Fisher, 1998; Hobden & Pliner, 1995). Modeling has also been linked in particular to an increase in child fruit and vegetable consumption (Cullen et al., 2001; Gross et al., 2010; Harper & Sanders, 1975). Our results support this, because

authoritative parenting was not only positively correlated to modeling, but also to the child behaviors of consuming foods considered "healthy" and raw foods.

Authoritarian

Child Behaviors

Authoritarian parenting was positively correlated to a number of behaviors that have been associated with picky eating, including cringing, crying or getting upset, being suspicious of food, needing specific preparation and presentation methods and showing signs of sadness or disappointment when food is not prepared "right" (**Table 5.4**). To our knowledge, these are the first results that show a connection between the authoritarian parenting style and toddler behaviors that specifically characterize mealtime difficulties. Furthermore, authoritarian parenting was negatively correlated to trying new foods and eating foods that are considered healthy (**Table 5.5**). It is already known that PE commonly consume a lower dietary variety than NPE and often avoid fruits and vegetables in particular (Carruth et al., 2004, Mayeaux-Boquin, 2010). Additionally, authoritarian parenting causes toddlers to eat fewer vegetables than children with authoritative parents (Patrick et al., 2005). Our findings strengthen the relationship between the authoritarian parenting style and picky eating, because children with authoritarian parents make fewer healthy food choices than those with authoritative parents. Also, the methods of authoritarian parents align with strategies that negatively influence child feeding.

Parent Strategies

The relationship between the authoritarian parenting style and child mealtime behaviors may be partially explained by the occurrence of parent mealtime strategies. Authoritarian

parenting was positively correlated to five negative mealtime strategies, including the use of restriction, pressure to eat and showing disapproval if the child does not eat (**Table 5.7**). When parents withhold a favorite food, dessert, or non-food activity, children have a greater desire to obtain what is forbidden and it also leads to negative emotions about food (Fisher & Birch, 1999a, 1999b; Lepper et al., 1982,). In regards to authoritarian parenting being linked to pressure to eat and force feeding, these actions alter a child's ability to self-regulate intake and do not increase the liking of unwanted foods (Birch et al., 1987a, Fisher et al., 2002; Galloway et al., 2005). Also, the use of disapproval and discouragement at the table is not as effective in creating successful eating habits as parental encouragement (Iannotti et al.,1994). Hubbs-Tait and others (2008) also found that authoritarian parenting was correlated to restriction and pressure to eat. Together, these approaches can foster a power-struggle wherein children may want to overcome parent control. This can lead to children expressing their feelings through difficult behaviors, such as crying and showing disappointment in the meal.

Additionally, authoritarian parenting was negatively correlated to four positive parent strategies including, making the meal fun, teaching their child about what is being served, involving their child in planning and preparing the meal, and encouraging their child to try new foods (**Table 5.6**). Teaching toddlers and involving them in food preparation raises their level of comfort with food and increases their exposure to new foods, which may reduce tendencies toward food neophobia (Rozin & Vollmecke, 1986; Dovey et al., 2008). Also, when trying a bite of novel foods is coupled with repeated exposure, this increases acceptance (Birch et al., 1982a, Sullivan & Birch, 1994). Since authoritarian parenting is not linked to these strategies, it only exacerbates the effect of the negative parenting strategies associated with this style.

Permissive

Child Behaviors

There was a high connection between the permissive parenting style and both picky and non-picky behaviors. Out of the 23 behaviors associated with picky eating, permissive parenting was positively correlated to 19 (**Table 5.4**). This included everything from behavioral issues, such as refusing to come to the table, crying and getting upset and refusing to open their mouth, to food-specific problems, such as eating a narrow range of foods, eating the same foods repeatedly, and drinking liquids instead of eating at meals. Furthermore, one of the strongest correlations was between the permissive style and parents perceiving their child as a PE. The influence of permissive methods on pickiness is additionally supported by the negative correlation of this parenting style to 12 out of the 14 NPE child behaviors (**Table 5.5**). Similar to the authoritarian style, permissive parenting is negatively correlated to trying new foods and eating foods that are considered "healthy". Both of these are characteristic of NPE who eat a wide variety of foods including fruits and vegetables (Carruth et al., 2004, Mayeaux-Boquin, 2010). Up until this study, most research regarding the permissive, or indulgent, parenting style has focused on its impact on child weight status. To our knowledge, these are the first results that related the practices of permissive parents specifically to PE and NPE mealtime behaviors.

Parent Strategies

The parent mealtime strategies that were correlated with permissive parenting do not encourage children to learn acceptance of new foods. This parenting style was positively correlated to negative parent strategies, such as offering rewards for eating, showing disapproval if the child does not eat, restricting something other than food as a consequence for not eating,

and making a separate meal for the child to eat if they do not like what is served (**Table 5.7**). The use of rewards by permissive parents was also observed by Hubbs-Tait and others (2008). Offering rewards or restricting a fun activity may seem like persuasive tactics; however, they do not cause acceptance of unwanted foods and do not help children increase their dietary variety (Birch et al., 1982, Fisher & Birch, 2000; Moore et al., 2007). Also, the method of making something else for the child to eat, either before or after the meal, does not encourage the child to accept new flavors. Exposure and tasting are important in the acceptability of novel foods (Birch & Marlin, 1982); therefore, if children are not asked to try a bite and can get their favorite food instead, they will not learn to overcome pickiness and food neophobia.

Permissive feeding can also be described as "indulgent", with parents being more lenient about boundaries and allowing their child more control over meals (Patrick & Nicklas, 2005). This is apparent through the positive correlation with not only rewards and making separate meals, but also with spoon-feeding the child and reasoning with the child to get them to eat. The combination of strategies used by permissive parents relays an almost desperate quality to get children to eat. Results showed a high negative correlation between the permissive style and the item "do not need to use any strategies to get my child to eat at mealtime" (**Table 5.6**), inferring that when parents are permissive, there feel a greater need to use strategies to bring order to the meal. Relinquishing too much control to the child alleviates parental authority and can create confusion over who is in charge (Baumrind, 1966), which may explain the attempts to encourage feeding through a wider variety of strategies.

Study Limitations

One limitation is that our results apply to parenting style typologies and not to parents classified as a specific style. The PSDQ assesses the authoritative, authoritarian, and permissive parenting styles as variables, which then allows researchers to measure the dimensions and practices that categorize each style (Robinson, Mandeleco, Olsen, & Hart, 1995). Additionally, parenting style is measured on two scales: 1) parental responsiveness and warmth given to the child, and 2) parental demandingness and expectations for the child's behavioral control (Maccoby & Martin, 1983). These scales serve as a spectrum and while there are authoritative, authoritarian, and permissive styles, parents can differ in how they exhibit their style due to their individual personalities. Barber (1996) stresses the role of psychological control as a third measurement of parenting. Psychological control refers the how parents impose their own values on their child's emotional development (Darling, 1999). With so many variations in how parents approach different situations and interact with their child, parenting styles have an element of fluidity and can change from one context to another (Darling, 1993). Therefore, while our findings show a definite trend between parenting styles and both parent mealtime strategies and child mealtime behaviors, the parents were not grouped into one precise style. Further work is needed to fully describe each parent's style and how it independently impacts each child's behavior.

A second limitation was our sample demographics. The participants were not diverse with a majority of parents being Caucasian and married with 2 to 3 children. Also, all participants were recruited the ICR database which they voluntarily signed up to be a part of. This indicates that parents were likely already interested in their child's mealtime habits and

nutritional status. However, despite this uniformity within the sample, we were still able to separate differences among the three styles of parenting.

Finally, a third limitation is the low correlation coefficients observed in the results, which may be interpreted as weak relationships. In measuring correlation, the coefficient value can lie anywhere between -1 and 1 with 0 indicating no relationship and 1 and -1 indicating a perfect linear relationship (Heiman, 2010). Our values ranged from positive and negative 0.09 to 0.34, all which showed significance ranging between $p < 0.05$ and $p < 0.001$. However, a low coefficient does not indicate that there is no relationship, only that it is not a strong linear relationship. There are a variety of factors that can lead to a lower correlation coefficient. One is a lack of linearity, which might indicate that the data are in a non-linear or curvilinear relationship. Another is that there is less variability in the numbers. When greater variability is present within data, the result is a larger correlation coefficient (Goodwin & Leech, 2006).

5.5 Conclusions

The strategies parents use to encourage feeding and modulate mealtime behaviors have a significant impact on their toddler's behavior. Parental perceptions, which stem from their parenting style, influence both their own actions, as well as their child's, at mealtime, which supports our hypothesis. Overall, the authoritative parenting style is characterized by the use of positive mealtime strategies and NPE behaviors. Authoritarian and permissive parenting styles show an opposite result and are typified by more negative mealtime strategies and PE behaviors. There is undoubtedly a relationship between the use of mealtime strategies and child pickiness; however, the direction of this causal relationship remains unknown. While picky eating is a

common occurrence in toddlers, it cannot be deciphered whether parent behaviors lead to a power struggle or whether the child's conduct causes frustration and contention by the parents.

What can be concluded from these results is that the way parents respond to mealtime difficulties can either exacerbate or diminish the problem. If practices commonly associated with the authoritarian and permissive styles such as restriction, rewards, and disapproval are used, levels of food acceptance can decrease and pickiness may worsen. Yet, if authoritative practices such as positive praise, modeling, and child involvement are used, children may overcome any natural tendencies towards food neophobia and can eventually grow out of picky eating. These findings indicate a need for parents to be cognizant of how they interact with their child during mealtimes. By ensuring the use of methods that promote an encouraging environment, parents are preparing their child for a lifetime of dietary diversity and independence.

5.6 Tables

Table 5.1 Demographic profile of parent participants

	Total (N=525)	
	Count	**%**
Gender:		
Female	500	95.2
Male	12	2.3
Prefer not to say	13	2.5
Age:		
18-25	25	4.8
26-35	383	72.9
36-45	110	20.9
46-55	3	0.6
Prefer not to say	4	0.8
Marital Status:		
Single	21	4.0
Married	497	94.7
Prefer not to say	7	1.3
Race:		
African American	8	1.5
Asian	2	0.4
Caucasian	492	93.7
Hispanic	4	0.8
Prefer not to say	19	3.6
Number of children:		
1	72	13.7
2	225	42.9
3	151	28.8
4	52	9.9
5	10	1.9
6	6	1.1
7	5	0.9
8	3	0.6
9	1	0.2

Table 5.2 Mealtime Assessment Survey list of 43 child behaviors divided by relationship to picky eating (PE), non-picky eating (NPE), or no significance (NS) according to results from Mayeaux-Boquin (2010)

BEHAVIOR	Status	P-Value
Goes for long periods of time without thinking about eating or saying "I'm hungry"	PE	0.003
Puts up a fight or refuses to come to the table when it is time for a meal	PE	<0.0001
Shows signs of fear, nervousness, or strong anxiety before mealtime	PE	< 0.0001*
Goes in and out of kitchen and questions about the meal being prepared	PE	0.029
Cringes, cries or gags after seeing or eating certain foods	PE	< 0.0001
Is disengaged/uninvolved while sitting at the table during mealtime	PE	< 0.0001
Is suspicious of food	PE	0.001
Carefully inspects the majority of food before taking a bite	PE	< 0.0001
Has something better to do than eating at mealtime	PE	< 0.0001
Shows signs of sadness or disappointment when food is not prepared / cooked "right"	PE	< 0.0001*
Needs to eat with special utensils/dishes	PE	0.0002*
Eats foods in sequence	PE	0.002
Takes a long time to finish a meal compared to the rest of the family	PE	< 0.0001
Refuses to open mouth when do not want to eat certain foods	PE	< 0.0001
Would rather drink liquids instead of eat the food at mealtime	PE	< 0.0001
Needs specific food presentation or preparation	PE	< 0.0001*
Eats the same foods repeatedly	PE	< 0.0001*
Eats from a narrow range of food (fewer than 10 different foods)	PE	< 0.0001
Eats foods from only one food group (ex. Eats only from meat group, grains group, etc.)	PE	< 0.0001
Eats the same meal for breakfast	PE	0.0001
Eats the same meal for lunch	PE	0.0001
Eats the same meal for dinner	PE	< 0.0001
Is a picky eater	PE	< 0.0001
Looks forward to eating and mealtime	NPE	< 0.0001*
Finishes all the food served on the plate	NPE	< 0.0001
Tries new foods	NPE	< 0.0001
Eats foods that are considered "healthy"	NPE	< 0.0001
Eats leftovers	NPE	< 0.0001
Eats foods with something in them that cannot be seen (ex. Filled foods like eggrolls)	NPE	< 0.0001
Eats foods that have touched each other on the plate	NPE	< 0.0001
Eats foods that are mixed or that have complex ingredients (ex. casseroles, lasagna)	NPE	< 0.0001
Eats foods with sauces on them (ex. Pasta with tomato sauce, turkey with gravy)	NPE	< 0.0001
Eats uncooked foods that are normally served raw (ex. Raw veggies, fruits)	NPE	0.002
Eats sour foods	NPE	0.016*
Eats bitter foods (even if they are just slightly bitter)	NPE	0.026
Eats foods that are "lumpy" (ex. sauce with pieces in it or stew)	NPE	<0.0001
Eats foods that are slippery or "slimy" (ex. Fried egg, Jell-O)	NPE	<0.0001
Eats salty foods		NS
Eats sweet foods		NS
Eats foods that are hard, dry or crunchy		NS
Eats foods that are smooth or pureed food with no detectable particulates		NS
Eats foods of only one particular color		NS

P value from Pearson's Chi-Square analysis (* P-value from Fisher's Exact Test, statistical significance ($p<0.05$))

Table 5.3 Mealtime Assessment Survey list of 25 parent mealtime strategies divided by whether they have a positive, negative, or neutral impact on child behavior at mealtime

STRATEGY	Impact
Arrange the food in an interesting way to make the meal fun (for example, making the food on the plate look like a smiley face).	Positive
Teach your child about the food served at the meal.	Positive
Allow your child to choose the foods they want to eat from the food that is served.	Positive
Praise your child about their food intake or feeding skills.	Positive
Involve your child in planning and preparing the meal.	Positive
Encourage your child to try new foods.	Positive
Make the meal into a game to encourage eating	Positive
Model to your child that Mom and/or Dad are eating the food so they should eat the food too.	Positive
Offer your child a favorite food, snack or sweet/dessert as a reward for eating.	Negative
Offer your child a non-food reward for eating food served at a meal (for example "if you eat your chicken and you can watch TV after dinner").	Negative
Show disapproval if your child does not eat.	Negative
Tell your child they cannot leave the table until a food is eaten (for example, "you must eat a bite of green beans before being excused").	Negative
Withhold a favorite food, snack or sweet/dessert as a consequence for not eating.	Negative
Withhold something other than food as a consequence for not eating (for example, "if you don't eat your casserole, you can't go outside after dinner").	Negative
Make your child finish all of the meal before getting dessert.	Negative
Make a different food for your child before the meal if they don't like what is being served. (for example, the family is eating casserole and the child eats macaroni & cheese)	Negative
Make a different food for your child after the meal if they didn't eat the food that was served.	Negative
Require your child to try a bite of each food on their plate.	Neutral
Reason with your child to get them to eat (for example, carrots are good for you because they help your eyes).	Neutral
Tell your child that the food tastes good.	Neutral
Spoon-feed your child to get them to eat.	Neutral
Assist your child in preparing to eat (for example, cutting meat into smaller pieces).	Neutral
Serve a combination of foods that are new and/or disliked with foods already preferred by your child.	Neutral
Allow your child to eat what they want and how much they want	Neutral
Do not need to use any strategies to get my child to eat at mealtime.	Neutral

*Classification of parent mealtime strategies assigned according to previous literature.

Table 5.4 Significant correlation coefficients (r) indicating the relationship between PICKY child behaviors and parenting styles

BEHAVIOR	Authoritative	Authoritarian	Permissive
PE- Puts up a fight or refuse to come to the table when it is time for a meal			0.29***
PE- Shows signs of fear, nervousness, or strong anxiety before mealtime		0.09*	0.13**
PE- Goes in and out of kitchen and questions about the meal being prepared	0.13**		
PE- Cringes or makes a negative face after seeing or eating certain foods		0.15**	0.22***
PE- Cries or gets upset after seeing or eating certain foods		0.13**	0.21***
PE- Is disengaged/uninvolved while sitting at the table during mealtime	-0.10*	0.15***	0.18***
PE- Carefully inspect the majority of food before taking a bite (is suspicious of food)		0.13**	0.16***
PE- Has something better to do than eating at mealtime			0.25***
PE- Shows signs of sadness or disappointment when food is not prepared / cooked "right"	0.10*	0.13**	0.15**
PE- Need to eat with special utensils/dishes			0.10*
PE- Takes a long time to finish a meal compared to the rest of the family	0.09*	0.14**	0.16***
PE- Refuses to open mouth when do not want to eat certain foods			0.19***
PE- Would rather drink liquids instead of eat the food at mealtime		0.11*	0.26***
PE- Needs specific food presentation or preparation		0.10*	0.17***
PE- Eats the same foods repeatedly			0.24***
PE- Eats from a narrow range of food (fewer than 10 different foods)			0.19***
PE- Eats foods from only one food group (ex. Eats only from meat group, grains group, etc.)			0.15**
PE- Eats the same meal for lunch			0.12**
PE- Eats the same meal for dinner			0.15**
PE- Is a picky eater		.10*	0.29***

Correlation values from Spearmans's Correlation Test, statistical significance at $p < 0.05$*, $p < 0.01$**, $p < 0.001$***

Table 5.5 Significant correlation coefficients indicating the relationship between NON-PICKY and non-significant child behaviors and parenting styles

BEHAVIOR	Authoritative	Authoritarian	Permissive
NPE- Looks forward to eating and mealtime	0.09*		-0.19***
NPE- Finishes all the food served on the plate			-0.25***
NPE- Tries new foods	0.09*	-0.10*	-0.22***
NPE- Eats foods that are considered "healthy"	0.22***	-0.20***	-0.26***
NPE- Eats leftovers			-0.17***
NPE- Eats foods with something in them that cannot be seen (ex. Filled foods like eggrolls)	0.10*		-0.12**
NPE- Eats foods that have touched each other on the plate	0.09*		
NPE- Eats foods that are mixed or that have complex ingredients (ex: casseroles, lasagna)			-0.09*
NPE- Eats foods with sauces on them (ex. Pasta with tomato sauce, turkey with gravy)	0.09*		-0.13**
NPE- Eats uncooked foods that are normally served raw (ex. raw veggies, fruits)	0.18***		-0.10*
NPE- Eats sour foods			-0.17***
NPE- Eats bitter foods (even if they are just slightly bitter)			-0.15**
NPE- Eats foods that are "lumpy" (ex. sauce with pieces in it or stew)	0.11*		-0.16***
NPE- Eats foods that are slippery or "slimy" (ex. fried egg, Jell-O)			-0.16***
NS- Eats sweet foods		0.16***	
NS- Eats foods that are hard, dry or crunchy	0.10*		
NS- Eats foods of only one particular color	-0.108*	0.18***	0.16**

Correlation values from Spearman's Correlation Test, statistical significance at $p < 0.05$*, $p < 0.01$**, $p < 0.001$***

Table 5.6 Significant correlation coefficients indicating the relationship between POSITIVE and NEUTRAL parent strategies and parenting styles

STRATEGY	Authoritative	Authoritarian	Permissive
Positive			
Arrange the food in an interesting way to make the meal fun (for example, making the food on the plate look like a smiley face).	0.23***	-0.15***	
Teach your child about the food served at the meal.	0.34***	-0.13**	-0.15**
Allow your child to choose the foods they want to eat from the food that is served.	0.11**		
Praise your child about their food intake or feeding skills.	0.27***	-0.09*	
Involve your child in planning and preparing the meal.	0.38***	-0.14**	
Encourage your child to try new foods.	0.31***	-0.12**	
Make the meal into a game to encourage eating	0.12**		0.12**
Model to your child that Mom and/or Dad are eating the food so they should eat the food too.	0.27***		
Neutral			
Require your child to try a bite of each food on their plate.	0.16**		
Reason with your child to get them to eat (for example, carrots are good for you because they help your eyes).	0.18***		0.09*
Tell your child that the food tastes good.	0.19***		0.12**
Spoon-feed your child to get them to eat.			0.13**
Assist your child in preparing to eat (for example, cutting meat into smaller pieces).	0.16***		
Serve a combination of foods that are new and/or disliked with foods already preferred by your child.	0.17***	-0.12**	
Allow your child to eat what they want and how much they want	0.11**	-0.09*	
Do not need to use any strategies to get my child to eat at mealtime.			-0.14**

Correlation values from Spearman's Correlation Test, statistical significance at $p < 0.05$*, $p < 0.01$**, $p < 0.001$***

Table 5.7 Significant correlation coefficients indicating the relationship between NEGATIVE parent strategies and parenting styles

STRATEGY	Authoritative	Authoritarian	Permissive
Negative			
Offer your child a favorite food, snack or sweet/dessert as a reward for eating.			0.18***
Offer your child a non-food reward for eating food served at a meal (for example "if you eat your chicken and you can watch TV after dinner").			0.25***
Show disapproval if your child does not eat.		0.28***	0.14**
Tell your child they cannot leave the table until a food is eaten (for example, "you must eat a bite of green beans before being excused").		0.15***	
Withhold a favorite food, snack or sweet/dessert as a consequence for not eating.		0.22***	
Withhold something other than food as a consequence for not eating (for example, "if you don't eat your casserole, you can't go outside after dinner").		0.23***	0.20***
Make your child finish all of the meal before getting dessert.		0.17***	
Make a different food for your child before the meal if they don't like what is being served. (for example, the family is eating casserole and the child eats macaroni & cheese)			0.27***
Make a different food for your child after the meal if they didn't eat the food that was served.			0.24***

Correlation values from Spearman's Correlation Test, statistical significance at $p < 0.05$*, $p < 0.01$**, $p < 0.001$***

CHAPTER 6
Parent and Teacher Perception of Picky Eating and the Use of Objective Behavioral Observations in Assessing Picky Eating

6.1 Abstract

As the primary caregivers, parents influence mealtime and picky eating through strategies they utilized to encourage feeding in their child. These strategies differ based on parenting style. Additionally, various environments, such as daycare or preschool, can impact mealtime behaviors in addition to parenting as toddlers learn from others who surround them. The objectives of this study were to 1) assess the relationship between parenting style and both parent and child mealtime behaviors, 2) categorize toddlers as a picky eater (PE) or non-picky eater (NPE) according to overall consumption and mealtime behaviors, and 3) compare perceptions of picky eating within the home and school environments. Thirty-five parents completed surveys about parenting style and mealtime behaviors while their children were observed during mealtime. Teachers also completed surveys about each child's mealtime behaviors. Results found a correlation between authoritative parenting, positive mealtime strategies, and non-picky eating, as well as a correlation between authoritarian and permissive parenting with negative mealtime strategies and picky eating. The frequency of child behaviors according to parents and teachers demonstrated a difference between environments with teachers experiencing fewer picky behaviors at school than parents see at home. Comparison of parent, teacher, and researcher assessments of pickiness did not reveal a trend in the categorization of children as PE and NPE. The correlations between parenting style and mealtime behaviors supported previous findings (Chapter 5). Differences between parent and teacher perceptions of picky behaviors show a variation within child behaviors from one environment to another. Finally, there was no

trend between parent, teacher, and observer PE and NPE assignments indicating a difficulty in complete dichotomization of picky eating status in toddlers.

6.2 Introduction

The way parents interact with their child and the strategies they use to encourage feeding play roles in shaping child behavior at mealtimes. By modeling healthy intake, increasing the availability of foods like fruits and vegetables, and consistently exposing their child to new foods, a parent can positively impact their child's eating patterns (Birch et al., 1987b; Cathey & Gaylord, 2004; Galloway et al., 2005; Nicklas et al., 2001; Patrick & Nicklas, 2005). On the other hand, parental practices such as pressure to eat, restricting certain foods, and using rewards for eating negatively affect a child's perception of food and decrease novel food acceptance (Birch et al., 1987a; Birch, 1999; Fisher et al., 2002; Galloway et al., 2005).

The use of various mealtime strategies is also influenced by parenting style. Authoritative parents are more likely to use positive strategies of modeling, encouragement, and offering healthy foods, while authoritarian and permissive parents have a greater likelihood of using negative strategies such as restriction and rewards (Hubbs-Tait et al., 2008; Hughes et al., 2005; Patrick et al., 2005). We observed these same results, as well as established a relationship between picky eating and both authoritarian and permissive parenting (see Chapter 5).

Along with the impact of parenting, a child's environment influences what they eat and how they behave. As toddlers develop, they are constantly watching and examining their surroundings, which leads to their imitation of observed behaviors (Bandura & Rosenthal, 1978). This effect of modeling is prevalent in the context of mealtimes as children see those around them and learn to accept or reject new foods through the actions of others (Birch, 1999). Every

child has a home environment that affects their dietary choices, but a large number of children are also impacted by a daycare or preschool environment. According to the US Census Bureau, in 2008 23.5% of infants and toddlers and 47.2% of preschoolers spend an average of more than 30 hours per week in a center-based daycare, preschool or Head Start program (Phillips & Lowenstein, 2011). The teachers and peers that children are exposed to in these settings can have just as great of an influence as parents do. Hughes and others (2007) demonstrated that caregivers in a Head Start environment have feeding styles that mimic parenting styles and affect the feeding patterns of children ages 3-5 in similar ways. Furthermore, peer modeling can alter food acceptance. The social influence of seeing a peer or friend consume a less preferred food can lead preschoolers to eat that food as well, even if it was originally disliked (Birch et al., 1980).

The goals of this study were to 1) further elucidate our current understanding of picky eating by assessing the impact of the childcare environment on PE and NPE behaviors and 2) compare that with parent and teacher assessments of whether that child was a PE or NPE. Our first objective was to correlate parenting styles to child and parent mealtime behaviors, which would support the findings from Chapter 5 with a different population. For this objective, we hypothesized that parenting style influences parental perceptions of their child's picky eating status. These perceptions then affect parent-child interactions including mealtime practices utilized by the parent, picky and non-picky eating behaviors in children, as well as the development of children's dietary preferences. The second objective was to assess pickiness in toddlers through non-biased methods by directly observing behaviors during mealtime. For the second objective, we hypothesized that children can be objectively dichotomized into picky and non-picky categories for research purposes based on dietary variety and exhibited behaviors.

Finally, our third objective was to compare and contrast toddler mealtime in the home and school environments by analyzing differences in parent and teacher survey results. We hypothesized that environmental influences will alter the way children behave at meals and differences will be detected between parent and teacher responses. Combining all three objectives, we can determine whether picky and non-picky behaviors observed by researchers align with various caregiver perceptions and broaden our knowledge regarding the factors that influence picky eating.

6.3 Materials and Methods

Procedure

This study was approved by the Institutional Review Board at the University of Illinois at Urbana-Champaign. Parent-child pairs were recruited through the Child Development Laboratory (CDL) and Early Child Development Laboratory (ECDL) located on the University of Illinois campus. All parents who had a 2-5 year old student enrolled in the CDL or ECDL during Fall of 2010 received a recruitment email and flyer about the "Toddler Mealtime Behavior Study". Five classrooms had children that were in the target age range: Twos 1, Twos 2, Preschool 1, Preschool, and Preschool 3. The only exclusion criteria were that children could not have any food allergies or other special diet restrictions. This measure was to ensure standardization in the menu served to each child. Parents signed a consent form before being officially enrolled in the study (Appendix I). The study procedure occurred in three parts: 1) parent surveys, 2) child observations, and 3) teacher surveys. A total of 35 parent-child pairs completed all components of the study and received a $15 gift card to Meijer for their time. Three teachers from each of the 5 classrooms took part in the teacher surveys for a total of 15

teachers. All children were assigned a code number to identify them during the study. Code numbers were assigned by CDL assisting staff.

Parent surveys

One parent from each household completed two online surveys through Survey Gizmo (www.surveygizmo.com). Parents entered their child's code number in the survey so that responses could be matched to their child. The first survey was the Mealtime Assessment Survey (MAS, Appendix H) developed by Mayeaux-Boquin (2010), which listed 43 mealtime behaviors and asked the frequency with which parents experience each behavior. The final item on this list asked if they consider their child a picky eater. Next, 25 mealtime strategies were listed and parents were asked how frequently they use each strategy. All responses were given on a 5-point scale (1=Never, 2=Rarely, 3=Sometimes, 4=Often, and 5=Always).

The second survey parents completed was the 32 item version of the Parenting Styles and Dimensions Questionnaire (PSDQ, Appendix B) (Robinson et al., 2001). The PSDQ measures how often various behaviors are exhibited by parents towards their child using three general styles of parenting: authoritative, authoritarian, and permissive. Among the 32 items, 15 behaviors relate to authoritative parenting, 12 relate to authoritarian parenting, and 5 relate to permissive parenting. All responses were given on a 5-point scale (1=Never, 2=Once in a while, 3=About half of the time, 4=Very often, and 5=Always). Robinson and others (2001) measured the internal consistency of the original 32 item PSDQ among parenting style constructs and reported Cronbach's alpha values of 0.86 for authoritative, 0.84 for authoritarian, and 0.64 for permissive (Robinson et al., 2001). In this study, Cronbach's alpha values were 0.77 for authoritative, 0.72 for authoritarian and 0.74 for permissive.

Teacher surveys

Teachers (n=15) completed a survey regarding mealtime behaviors of children participating in the study. The questionnaire was a modified version of the Mealtime Assessment Survey given to parents (Appendix J). The teacher survey was modified because certain items that appeared on the parent MAS were not relevant to the school environment, such as whether the child "eats leftovers", which was not an option at CDL and ECDL meals. There were 31 behavioral items on the teacher MAS that represented actions of PE and NPE. All responses for child behaviors on the teacher MAS were given on a 5-point scale (1=Never, 2=Rarely, 3=Sometimes, 4=Often, and 5=Always). Each classroom had three main teachers who divided up the study participants in their classroom; therefore, one teacher survey was completed for each child. The instructions, child code numbers, and link to the Survey Gizmo online questionnaire were provided to teachers via email. Teachers completed a hard-copy consent form before taking the survey (Appendix K)

Child observations

Children of parents that had consented to participation and completed the two online surveys were observed during lunchtime at the CDL and ECDL. Each child was videotaped for three consecutive lunch session for 15 minutes each. The menu at the CDL and ECDL was served on a rotating schedule across a four-month period and all 35 children were observed being served the same menu in order to standardize the mealtime conditions. Day 1 was turkey with gravy, mashed potatoes, cranberry salad, corn muffins, and milk. Day 2 was chicken fingers, mixed vegetables, pears, whole wheat crackers, and milk. Day 3 was cold chicken strips, salsa, raisins, tortilla chips, and milk. Children were offered every food item by teachers, but were not

required to take foods they did not want. However, they were required to try a bite of all foods, even if it was not originally served, before getting a second serving. Three camcorders were placed in each classroom, one for each table, in order to document mealtime behavior of multiple children concurrently. For analysis, videos were edited to focus on the study subjects.

Analyses

Statistics

The data collected through the parent and teacher MAS surveys were considered ordinal. Due to responses being on a frequency scale with word anchors, we could not assume that intervals between responses were equal in the minds of the participants (Fink, 2003). Since we could not meet the assumption of normality nonparametric statistics were conducted (O'Mahony, 1986). To determine the presence of significant correlations between parenting styles and child behaviors, as well as parenting styles and parent mealtime strategies from the parent MAS and PSDQ results, Spearman's ranked correlation coefficients were calculated. To determine any significant differences between parent and teacher responses on the MAS questionnaires, data were analyzed by the related two-sample Wilcoxon signed-rank test. Parent and teacher responses were compared for each behavior across all children. All nonparametric tests were conducted through XLSTAT (Version 2012, Addinsoft USA, New York, NY).

Video analysis

The three 15-minute mealtime videos collected for each child were quantitatively analyzed using the video annotation software VCode and VData (Hailpern & Hagedorn, http://social.cs.uiuc.edu/projects/vcode.html). Each video was coded via event sampling by three

researchers who quantified behaviors: one primary coder who analyzed all 35 children, and two secondary coders who were randomly assigned across subjects. To assess dietary variety, the number of foods served, the number of times seconds were requested, the number of second helpings served, and number of bites taken of each plated item was coded. There were also a number of behaviors associated with PE that were coded, including playing during the meal (with or without food), crying/getting upset, refusing to come to the table, making a negative face, spitting out food, and being distracted by something other than the meal (Appendix L). The point-by-point agreement across all three coders was calculated. Qualitative notes were taken in addition to quantitative coding in order to describe the child's behavior, add behavior details, and document how children react in different mealtime situations (Appendix M).

After video analysis was complete for each child, they were categorized as a PE or NPE based on objective criteria regarding overall consumption variety and behaviors. The determination of PE status was based in the amount of foods the child willingly tasted and consumed. This is because the definition for "picky eater" is eating a limited dietary variety and rejecting both new and familiar foods (Carruth et al., 1998; Dovey et al., 2008). Picky eating can then be displayed through a number of mealtime difficulties such as getting upset, refusing to try certain foods, and being disengaged or uninvolved at the table (Mayeaux-Boquin, 2010). In this analysis, children were considered to be a PE if they exhibited one of the following behaviors: 1) refused to eat one entire food group combined across all meals (i.e. fruits or vegetables, 2) ate only three out of the four foods at each meal and demonstrated at least one picky behaviors, 3) tried less than 75% of foods offered across all meals excluding milk.

Even though NPEs do not necessarily consume all foods, they willingly eat a significantly greater variety than PEs, especially in the fruits, vegetables and protein categories

(Carruth et al., 2004; Mayeaux-Boquin, 2010). Also, NPEs exhibit fewer mealtime difficulties and often look forward to mealtime, try new foods, and finish all the food served to them (Mayeaux-Boquin, 2010). Children were considered to be NPE if they met one of the following criteria: 1) served and ate at least one bite of every food across all meals, 2) ate three out of the four foods at each meal but did not demonstrate any picky behaviors, 3) tried at least 75% of foods offered across all meals excluding milk, 4) mixed two or more foods together that are not traditionally consumed at once (i.e. mixed the cranberry salad and mashed potatoes together on Day 1).

6.4 Results and Discussion

Influence of parenting styles

The correlation analysis was conducted between parenting styles and the MAS questionnaire as reported in Chapter 5. This study had a different population and smaller sample size, but similar trends were seen regarding the relationship of parenting styles to both child behaviors and parent mealtime strategies. Results indicated that authoritative parenting was associated with a mealtime experience that promotes "non-pickiness", while authoritarian and permissive parenting styles were related to a more difficult mealtime environment. These findings support our first hypothesis that parenting style affects how parents feed their children and can impact child mealtime behaviors.

Authoritative

Overall, the authoritative parenting style was positively correlated to NPE child behaviors and negatively correlated to PE behaviors. The NPE child behaviors related to authoritative

parenting included eating foods that are mixed or have complex ingredients, as well as eating foods that are "lumpy" and have pieces in them, such as a stew (**Table 6.1**). Consistent with the results of Mayeaux-Boquin (2010), NPEs consumes mixed and lumpy foods such as spaghetti with meat sauce, beef and vegetable stew, chicken pot pie, casserole, meat and potatoes, and stuffed green peppers significantly more than PEs. Authoritative parenting was not associated with any behaviors typical of PEs and was negatively correlated to children refusing to open their mouth, wanting to drink liquids instead of eat, eating from a narrow range of food, and eating the same meal for breakfast (**Table 6.1**). This further supports the relationship between authoritative parenting methods and NPE behaviors because NPEs have a greater dietary diversity and fewer problems at the table (Carruth et al., 1998).

There were very few significant correlations observed in this study between parenting styles and parent mealtime strategies. However, there was one positive correlation between the authoritative parenting style and the parent strategy "encourage your child to try new foods" (**Table 6.2**). This approach is in keeping with authoritative parenting, which is characterized by promoting child development through encouragement, while still supporting the child's autonomy (Mattanah, 2005). In the context of feeding, the use of positive prompts by parents at mealtime has greater success in getting children to eat than the use of discouraging remarks (Iannotti et al., 1994). This strategy could relate back to children's consumption of mixed and lumpy foods, which was also associated with authoritative parenting.

Authoritarian

The authoritarian parenting style was positively correlated to a number of behaviors associated with picky eating (**Table 6.1**). These include showing signs of nervousness before

mealtime, crying or getting upset, gagging after seeing or eating certain foods, eating foods in sequence during the meal, eating the same foods repeatedly, eating from a narrow range of foods, eating from one food group, and eating the same meal for breakfast. Many of these correlations were the same as what was observed in Chapter 5. The strongest correlation, which was significant at $p<0.001$, was "Eats from a narrow range of food (fewer than 10 different foods)". This behavior, along with eating the same foods and eating from only one food group, shows an important connection between authoritarian parenting and the prevalence a picky eating. The basis of defining a PE lies in consuming a low dietary variety, rejecting new foods, and having a specific range of foods they prefer to eat (Carruth et al., 1998; Dovey et al., 2008; Jacobi et al., 2008). The other behaviors may be related to how children express their selective feeding choices. Mayeaux-Boquin (2010) proposed that there might be different types of PEs. For example, she described "the Behavioral Responder" as a child who puts up a fight before the meal, or cringes, cries, or gags at certain foods. In these results, authoritarian parenting was correlated to the child showing fear and anxiety before the meal, crying or getting upset over certain foods, and gagging in reaction to food. All of these behaviors are an outward display of emotion by the child to express their feelings about the food, which could cause problems during the meal.

In addition to being positively correlated to PE behaviors, authoritarian parenting was also negatively correlated to four NPE mealtime behaviors (**Table 6.1**). These child behaviors were looking forward to mealtime, trying new foods, eating "lumpy" foods, and eating foods that are slippery or "slimy." The most significant negative correlation was between authoritarian parenting and "tries new foods" ($p<0.01$), which supports the findings of positive correlations with eating a narrow range of foods and eating the same foods repeatedly. Regarding the

correlation of authoritarian methods and children avoiding foods with certain textures, the findings may be related to another type of PE described by Mayeaux-Boquin (2010): "the Sensory Dependent" child. Chatoor and Ganiban (2003) termed this behavior "sensory food aversion" and it is defined by unpleasant reactions when consuming certain tastes and textures. There may be a connection between sensory food aversion and unwillingness to try new foods because a negative sensory experience can exacerbate the reluctance to try other similar foods (Chatoor & Ganiban, 2003).

There were two parent mealtime strategies that were negatively correlated with the authoritarian style: teach your child about the food served at the meal, and serve a combination of foods that are new and/or disliked with foods already preferred by your child (**Table 6.2**). Although neither of these strategies was positively correlated to any parenting style, they are more characteristically authoritative than authoritarian. Hughes and colleagues (2005) termed authoritative parents as more nurturing than authoritarian parents and in Chapter 5 there was a significant positive correlation between authoritative parents and teaching at mealtime. The negative correlation of this action in these results further indicates the opposite effect of authoritative and authoritarian parenting during feeding. Also, as a method to encourage enjoyable meals, Cathey & Gaylord (2004) recommend serving both favorite foods of the child, as well as new foods to foster acceptance. These results indicate that authoritarian parents do not use this strategy.

Permissive

Similar to the authoritarian style, permissive parenting was positively correlated to behaviors associated with picky eating, while being negatively correlated to typical NPE

behaviors (**Table 6.1**). Picky mealtime behaviors related to permissive parenting were being disengaged/uninvolved at the table, eating foods in sequence, needing a specific presentation, and eating the same meal for lunch. These behaviors relate to the child having very particular preferences for how food should be presented and consumed. Seeing that children are having specific expectations at mealtime could be related to the parenting style. Permissive parents are more lenient than authoritative or authoritarian parents and often give their child more control over what is served (Patrick & Nicklas, 2005); therefore, if the parents try to take control away and serve something new they could be met with resistance and struggle from the child.

Permissive parenting was also negatively correlated to four non-picky child behaviors. These included eating foods that have touched each other on the plate, eating foods that are mixed or have complex ingredients, eating sour foods, and eating foods that are "lumpy" with pieces in them. The negative correlation to eating foods that have touched each other on the plate further supports the perfectionist behaviors seen above such as needing certain presentation and eating foods in sequence. Meanwhile, the other three negative correlations are related to the food sensory aversion, also seen with the authoritarian style (Chatoor & Ganiban, 2003). Humans innately reject sour foods and PEs may not have developed acceptance yet to this taste (Birch, 1999). Another explanation for rejecting specific types of foods, besides food sensory aversion, is tactile defensiveness which is a heightened sensitivity to certain tastes and textures (Smith et al., 2005).

Only one parenting strategy was positively correlated to the permissive parenting style. It was "offer your child a favorite food, snack or sweet/dessert as a reward for eating", which is associated with negative child feeding outcomes. Parents often utilize the strategy of rewards because they want to get their child to eat healthy foods like fruits and vegetables; however, the

outcomes are not what parents want in the long-run (Birch & Fisher, 1998; Scaglioni et al., 2008). Giving rewards creates a negative connotation in the minds of children about the food they have to eat in order to receive the food they really want (Birch et al., 1982; Birch et al., 1984). In the end, this does not promote food acceptance and can lead children to dislike certain foods, such as vegetables, even more than they did before (Rhee, 2008). Also, the use of rewards for eating might create a stimulus-response habit where a food reward becomes anticipated by the child. Reward learning creates a cognitive expectation that an incentive will be earned for completing a task (Berridge, 2000); therefore, if a food is eaten in order to get a reward, it does not necessarily teach the child to accept the unwanted food long-term.

Parent and teacher survey results

Picky behaviors

Out of the 17 behaviors on the MAS that were associated with picky eating, 8 behaviors were given significantly higher score by parents than teachers (**Table 6.3**). These behaviors include: refusing to come to the table, cringing after seeing or eating certain foods, has something better to do than eat during mealtime, showing signs of disappointment over food, refusing to open mouth, would rather drink liquids than eat, eats the same foods repeatedly, and is a picky eater. The mean score for pickiness given by parents was 2.74 out of 5, while teachers gave 2.09 out of 5, which indicates that parents perceive a higher prevalence of pickiness at home than teachers see with the same children at the CDL and ECDL. Further support of this finding is the other seven picky behaviors that parents indicated occur more frequently at home than at school.

Some of the differences between the parent and teacher responses may relate to the controlled environment at the CDL and ECDL. Researchers spent over 20 hours in the two facilities observing children, practicing data collection, and obtaining research videos; therefore, they became familiar with the protocol of lunchtime. Every student was served from a set menu and the only alterations in diet were due to food allergies or family beliefs. If a child did not like what was being served, there was no other option to eat. Parents gave a mean rating of 3.51 for "eats the same foods repeatedly", while teachers gave a 2.66. These behaviors may not be as prevalent at the CDL and ECDL because the menu is pre-planned. The same foods are only served so often during a four week meal plan so students do not have the choice of eating the same foods. While we do not know what food is served by parents, children may have more control over what they can eat in the home environment.

Many of the behaviors scored higher by parents can be described as defiant reactions by the child towards their parent's requests. Putting up a fight or not coming to the table, making a negative face, showing signs of sadness, and refusing to open their mouth are all ways in which toddlers might expresses their desire to not want to eat a particular food. During development, children begin exerting autonomy around age 2, and if they feel their ability to make independent decisions is restricted, this can create power struggles between parents and children (Crockenberg & Litman, 1990). At the same time, children are figuring out how to self-regulate the expression of their negative emotions (Grolnick, 1996). They are learning the difference between internalizing an emotion and deciding whether or not it is appropriate to outwardly exhibit that feeling (Banerjee, 1997). Applying this to the context of mealtimes, a child who has difficulty articulating their emotions about disliked foods may result in displaying defiant behavior. However, what is unknown in these results is why these behaviors are more prevalent

at home than at school. Crockenberg & Litman (1990) found that defiant behaviors in toddlers occur more frequently when caregivers use negative tactics, such as threats, criticism, or anger, to control their child; therefore, a difference may be present in how parents and teachers at the CDL and ECDL manage and exert authority. Also, there is a link between an increase in child behavior problems and inconsistent parenting, such as not following through on discipline (Gardner, 1989). Since the CDL and ECDL are controlled environments with standardized procedures, there could be greater consistency in expectations and less opportunity for children to engage in a power struggle during mealtime.

Non-picky behaviors

There were 11 matching behaviors on the parent and teacher MAS questionnaires and three of them showed a significant difference between scores (**Table 6.3**). The behavior "eats uncooked foods that are normally served raw" had a significantly higher rating by parents than teachers indicating children consume these foods more frequently at home than school. This finding was somewhat contradictory because PEs often avoid raw foods, such as fruits and vegetables, and there was a higher prevalence of picky behaviors reported by parents (Carruth et al., 1998; Mayeaux-Boquin, 2010). However, this difference might be because most of the fruits and vegetables served at the CDL and ECDL were cooked, so there were fewer opportunities for children to eat raw foods.

The other two significantly different non-picky behaviors were scored higher by teachers than parents. Teachers reported a mean score of 4.20 for "looks forward to eating and mealtime" and 3.52 for "finishes all the food served on the plate", versus the parent scores of 3.80 and 3.14, respectively. Both of these behaviors further support the previous findings about fewer picky

eating behaviors at school. Teachers are experiencing a lower prevalence of pickiness and an increase occurrence of children who consume their food without problems. It is unknown what difference exists in the school environment that makes children more excited for mealtimes than at home. According to our focus groups (Chapter 4), parents frequently mentioned that dinnertime is the most challenging meal because it is when they implement new menu items and everybody is tired at the end of the day. Perhaps the variation in looking forward to mealtime is based on child preferences for lunch and dinner, with lunch taking place at school and dinner taking place at home. As for children finishing their food more often at the CDL and ECDL than at home, this may partly be due to exposure. Repeated exposure of foods can increase acceptance in children and at the CDL and ECDL many menu items appear over and over throughout the year, which could affect the students' liking (Birch & Marlin, 1982; Birch et al., 1987b).

Our second hypothesis was also supported because there was difference in behaviors between the home and school environments. Children appeared to exhibit a greater prevalence of picky behaviors in the home environment according to the comparison of parents' and teachers' responses.

Child observations

Categorization of picky or non-picky status

Point-by-point agreement achieved between the primary and secondary coders across all child mealtime videos was 83%. Thirty-five children were observed and based on our established criteria, 29 were categorized as a NPE and 6 were categorized as a PE (**Tables 6.4 and 6.5**). The basis of our classification was in the number of foods children ate, or at least

tasted, across all observed meals because the foundation of what defines a picky eater is the consumption of a limited dietary variety (Dovey et al., 2008; Jacobi et al., 2008). Despite difference in total consumption, all of the children tried at least 50% of the foods offered. Among foods that were liked and eaten, all but 3 of the children were served second helpings.

Dietary variety and behaviors exhibited by the 29 NPE children are in **Table 6.6**. Ten of these children were served and tasted 100% of the lunchtime foods offered across all meals. Two children, PS320 and T109, were right at the 75% cut-off point; however, they exhibited minimal difficulties. They also both willingly mixed two foods that do not commonly go together: one mixed cranberry salad and mashed potatoes, while the other put their chicken finger between two crackers like a sandwich. Only one child labeled as NPE did not meet the requirement of trying 75% of the foods and only ate a 66.7% variety across all meals (PS315); however, they mixed their mashed potatoes, cranberry salad, and potatoes together on Day 1, then ate their raisins and chicken together on Day 3. Mixing of foods was seen as a sign of food adventurousness, which is often lacking in picky eaters who eat significantly fewer mixed dishes than non-picky eaters (Mayeaux-Boquin, 2010; Pliner & Hobden, 1992). One standard rule at the CDL and ECDL is that students must try a bite of all foods, even if the foods originally were not wanted, before receiving seconds of a preferred food. Four NPE children willingly tried an unwanted food in order to get more of something else. For example, one child asked for more chicken but was not initially served the mixed vegetables on Day 2. Once the vegetables were served and a bite was demonstrated to the teacher, the child then received second helpings of chicken.

There were 6 children labeled as a PE by researchers (**Table 6.5**). All of them tried 75% or less of the foods offered with two children only trying 50%. The food categories consumed

least were the fruits and vegetables and none of the PEs tasted the mixed vegetables served on Day 2. This finding is in line with previous research results that indicate PEs often have lower variety in their diet and consume fewer healthy foods such as fruits and vegetables (Carruth et al., 1998; Carruth et al., 2004; Mayeaux-Boquin, 2010). Child T207 did try 75% of the foods served; however, the child was constantly playing, often only took one bite of the food, and did not take any vegetables. A common behavior associated with picky eaters is the complete rejection of entire food groups, especially vegetables (Carruth et al., 1998; Jacobi et al., 2003, Mayeaux-Boquin, 2010).

An unexpected finding in these results was the lack of picky behaviors overall observed by researchers. No child put up a fight when it was time for a meal, refused to open their mouth, or gagged when they ate certain foods. For the most part, they conformed to the mealtime expectations and ate their lunch with minimal disruptions. Children learn to understand what is permissible under the rules and constraints of their environment (Harris & Nunez, 1996); therefore, in an environment where there are no other meal options, they may learn that it is not worth the effort to get upset about what is served. Among all 35 children, only 6 had a negative reaction to food that was served often expressed through a frown or furrowed brow (**Tables 6.4 and 6.5**). Yet, out of these 6 children, 5 were categorized as NPE and tried more than 80% of the foods served.

One common behavior seen in both PE and NPE children was distraction (**Tables 6.4 and 6.5**). Twenty-six were distracted by something other than what was going on at their table at least once during the three meals. Children would watch someone across the room, tune into conversations at the next table, or just stare off in thought about something else. Sometimes, distraction turned into playing with food, other children, or their utensils. Eighteen children

exhibited some form of play during the observation period; however, 14 of these children were still considered non-picky indicated the play did not take away from their overall consumption (**Tables 6.4 and 6.5**). Distraction and playing at the table could be construed as the child being disengaged or uninvolved during meals, which according to Mayeaux-Boquin's findings (2010) was significantly associated with PE. Still, it is well understood that play is a part of a child's development and may not always signify a mealtime difficulty related to picky eating (Yawkey & Silvern, 1977).

Comparison of subjective and objective categorizations

There was no distinct pattern in how the status of PE or NPE assigned by researchers lined up with the results from the parents' and teachers' MAS questionnaires. Overall, there were 10 children who were rated the same by researchers, parents, and teachers with 8 labeled as NPE and 2 labeled as PE (**Tables 6.6 and 6.7**). We hypothesized that researchers objective assignments would align closely with teacher's perceptions since both were set in the CDL and ECDL environment. This was not fully supported as evident by only 12 out of 35 children being categorized the same by researchers and teachers. Eleven of these 12 were classified as NPE, with teachers giving scores of "never" (1) and "rarely" (2) when asked if the child was picky (**Table 6.6**). All of these children were given the score of "sometimes" (3) by their parent. One child (PS209) who was rated as PE by both researchers and teachers was given a score of often (4) by teacher, but a score of "rarely" (2) by their parents (**Table 6.7**).

There were 7 children who were categorized the same by researchers and parents, which was unexpected. Four of them were considered non-picky, while teachers all provided a score of "sometimes" (3) which classified them as picky (**Table 6.6**). The other three were labeled as PE

by researchers and parents, but not by teachers (**Table 6.7**). Child PS207 was given a score of "sometimes" (3) by parents and considered picky by researchers; however, teachers gave the same child the score of "never" (1) for pickiness. Similar results were seen with child T108 who was scored as "often" (4) by parents, but only as "rarely" (2) by teachers. **Table 6.7** shows that child PS207 only tried 50% of the foods offered, while T108 ate a 62.5% variety. It is not fully known why teachers viewed the child to be non-picky; however, it may be due to children not exhibiting as many picky behaviors at school as indicated by **Table 6.3**.

Also unpredicted was the finding that 5 children were considered as PE by parents and teachers, but observers classified them as NPE (**Table 6.6**). Three of these children (PS307, PS310, and PS315) were on the border of PE and NPE with ratings of "sometimes" (3) by parents and teachers. Yet, two of them (PS107 and PS310) were given a rating of "always" (5) by parents, while researchers considered them to be non-picky. According to **Table 6.4**, they tried 83.3% and 100% of the foods served. Child PS107 is of particular interest because they twice tried an unwanted food in order to get seconds, indicating a willingness to try something new; however, parents see them as always picky. This brings up the question of how parents and teachers are differing in how they interact with children during meals at home and at school.

Overall, we were unable to see a definite trend among how parent, teachers, and researchers categorized the pickiness of the preschoolers. Part of this may be due to an inability to completely dichotomize children as one or the other. Findings from Mayeaux-Boquin's work (2010) indicated that picky behaviors exist on a spectrum from extremely non-picky to extremely picky with a large number of children falling in the "sometimes" range. We saw a similar trend explained by parents during our focus groups (Chapter 4). Parents were not always able to say fully that their child was picky or non-picky as evident by five parents being undecided.

Additionally, out of those parents who were able to label their child one way or the other, some qualified their response by saying that the child sometimes alters their behaviors. In the data for this project, we can conclude that the 10 children categorized the same way by researchers, parents, and teachers are likely on the extreme ends of the spectrum, while the remaining children are on the moderate side as picky and non-picky eaters.

Another issue to take into consideration is the ability to separate picky eating from mealtime difficulties that are unrelated to a child's food choices and general behavioral problems. When asked about problems during mealtimes, parents often report that their child refuses to eat certain foods, which is part of the definition for pickiness (Carruth et al., 1998; Dovey et al., 2008; Jacobi et al., 2008); however, parents also mention issues such as their child playing, taking a long time to eat, making a mess, and having a lack of interest in food (Jacobi et al., 2003; Pelchat & Pliner, 1986; Wright et al., 2007). A study by Jacobi and others (2008) also began to make a distinction between picky eating and other eating disturbances. There currently is no research indicating whether or not caregivers can make the distinction between picky eating and other mealtime difficulties they may experience. Also, apart from challenges during meals, many toddlers have general behavior problems which, according to parents and teacher reports, peak around ages 2-3 (Campbell, 1995). When child problems such as attention issues, noncompliance with parent's requests, and aggression are brought to the table, parents may struggle with getting the child to eat, yet this does not necessarily indicate the child is picky.

Study Limitations

There were some limitations to this study. First of all, there was a small sample size. This study was a mixture of quantitative and qualitative procedures between the surveys and

observations. For some qualitative research a smaller sample size is adequate, but for survey sampling, a larger sample is preferred (Sandelowski, 1995). In the instance of this particular study, we were limited by the facilities where the research was conducted. Only 88 children enrolled at the CDL and ECDL were in our target age range, and some of them have food restrictions due to allergies and family preference. Originally 53 parents indicated interest in participation, but only 35 completed the study for a 66% retention rate.

Another limitation was there was a lack of information to fully explain the differences in the data. While we observed the children in the school environment, the only reference we have for their behavior in the home environment is parental reports. There is no knowledge about what foods they were served at home and how their parents interacted with them during mealtimes. Also, we had data on the strategies parents us in the home and were able to correlate this information to parenting style; however, there was no data collected on the strategies teachers use at the CDL and ECDL to encourage feeding. There may be differences in the mealtime strategies used by parents and teachers.

6.5 Conclusions

This study served as an exploratory step in assessing the differences in child mealtime behaviors between the home and school environments. It is apparent that difference exists in how children behave between the two settings. Teachers at the CDL and ECDL experienced fewer incidences of picky eating compared to what parents observe at home. Within the home environment, parenting styles play a role in the way parents and children interact with one another. This ultimately influences the behaviors of the child with the authoritative parenting style fostering positive eating habits, while the authoritarian and permissive parenting styles may

exacerbate the expression of picky behaviors. What remains to be explored is how teachers interact with the same children during meals. If teachers are having fewer difficulties getting children to eat, their actions may suggest successful strategies parents can utilize themselves at home.

An important finding from this study was the difference in picky eating perceptions that were present among parents, teachers, and researchers. Based on previous picky eating work, researchers aimed to objectively categorized children as picky or non-picky based on overall consumption and mealtime behaviors. The results demonstrated that there was no pattern between the researchers' observations and what teachers and parents reported. Currently there is a distinction in the literature between picky eating and food neophobia (Dovey et al., 2008); yet, this may need to be taken a step further. Our findings suggest that there should be even further separation of mealtime difficulties: picky eating, non-food related mealtime behavior problems, and general child behavior problems. As research in this area continues, it will be challenging to fully define the concept of picky eating until discrete parameters are set to classify various mealtime issues that parents experience.

6.6 Tables

Table 6.1 Significant correlation coefficients indicating the relationship between child behaviors and parenting styles

BEHAVIOR	Authoritative	Authoritarian	Permissive
PE- Shows signs of fear, nervousness, or strong anxiety before mealtime		0.39*	
PE- Cries or gets upset after seeing or eating certain foods		0.44**	
PE- Gags or has a physical reaction after seeing or eating certain foods (NOT related to food allergies)		0.37*	
PE- Is disengaged/uninvolved while sitting at the table during mealtime			0.40*
PE- Eats foods in sequence during the main course (ex: all peas first, then all potatoes, etc)		0.40*	0.45**
PE- Refuses to open mouth when do not want to eat certain foods	-0.38*		
PE- Would rather drink liquids instead of eat the food at mealtime	-0.37*		
PE- Needs specific food presentation or preparation			0.39*
PE- Eats the same foods repeatedly		0.35*	
PE- Eats from a narrow range of food (fewer than 10 different foods)	-0.44**	0.59***	
PE- Eats foods from only one food group (ex. Eats only from meat group, grains group, etc.)		0.42*	
PE- Eats the same meal for breakfast	-0.36*	0.34*	
PE- Eats the same meal for lunch			0.349*
NPE- Looks forward to eating and mealtime		-0.37*	
NPE- Tries new foods		-0.51**	
NPE- Eats foods that have touched each other on the plate			-0.50**
NPE- Eats foods that are mixed or that have complex ingredients (ex: casseroles, lasagna)	0.36*		-0.36*
NPE- Eats sour foods			-0.40*
NPE- Eats foods that are "lumpy" (ex. sauce with pieces in it or stew)	0.46**	-0.34*	-0.44**
NPE- Eats foods that are slippery or "slimy" (ex. Fried egg, Jell-O)		-0.36*	
NS- Eats foods of only one particular color			0.38*

Correlation values from Spearman's Correlation Test, statistical significance $p < 0.05$*, $p < 0.01$**, $p < 0.001$***

Table 6.2 Significant correlation coefficients indicating the relationship between parent strategies and parenting styles

STRATEGY	Authoritative	Authoritarian	Permissive
Positive			
Teach your child about the food served at the meal.		-0.39*	
Encourage your child to try new foods.	0.45**		
Negative			
Offer your child a favorite food, snack or sweet/dessert as a reward for eating.			0.37*
Neutral			
Serve a combination of foods that are new and/or disliked with foods already preferred by your child.		-0.41*	

Correlation values from Spearman's Correlation Test, statistical significance $p < 0.05$*, $p < 0.01$**, $p < 0.001$***

Table 6.3 Parents and teacher mean responses to picky and non-picky child behaviors from the Mealtime Assessment Survey.

BEHAVIOR	Parent	Teacher	P-Value
Picky Behaviors			
Puts up a fight or refuses to come to the table when it is time for a meal	**2.40**	**1.49**	**<0.0001**
Shows signs of fear, nervousness, or strong anxiety before mealtime	1.09	1.23	NS
Cringes or makes a negative face after seeing or eating certain foods	**2.83**	**2.06**	**0.002**
Cries or gets upset after seeing or eating certain foods	1.71	1.46	NS
Gags or has physical reaction after seeing or eating certain foods	1.63	1.43	NS
Is disengaged/uninvolved while sitting at the table during mealtime	1.80	1.54	NS
Carefully inspects majority of food before taking a bite (is suspicious of food)	2.54	2.06	NS
Has something better to do than eating at mealtime	**2.80**	**1.40**	**<0.0001**
Shows signs of sadness or disappointment when food is not prepared / cooked "right"	**2.00**	**1.60**	**0.049**
Eats foods in sequence	2.23	2.49	NS
Takes a long time to finish a meal compared to the rest of the family	2.91	2.86	NS
Refuses to open mouth when do not want to eat certain foods	**2.51**	**1.20**	**<0.0001**
Would rather drink liquids instead of eat the food at mealtime	**2.20**	**1.66**	**0.025**
Eats the same foods repeatedly	**3.51**	**2.66**	**0.001**
Eats from a narrow range of food (fewer than 10 different foods)	2.26	1.97	NS
Eats foods from only one food group (ex. Eats only from meat group, grains group, etc.)	1.80	1.66	NS
Is a picky eater	**2.74**	**2.09**	**0.005**
Non-Picky Behaviors			
Looks forward to eating and mealtime	**3.80**	**4.20**	**0.023**
Finishes all the food served on the plate	**3.14**	**3.54**	**0.034**
Tries new foods	3.51	3.40	NS
Eats foods that are considered "healthy"	3.86	3.77	NS
Eats foods with something in them that cannot be seen (ex. Filled foods like eggrolls)	3.31	3.49	NS
Eats foods that have touched each other on the plate	3.97	3.94	NS
Eats foods that are mixed or that have complex ingredients (ex. casseroles, lasagna)	3.49	3.80	NS
Eats foods with sauces on them (ex. Pasta with tomato sauce, turkey with gravy)	3.71	3.86	NS
Eats uncooked foods that are normally served raw (ex. Raw veggies, fruits)	**4.09**	**3.60**	**0.006**
Eats foods that are "lumpy" (ex. sauce with pieces in it or stew)	3.26	3.66	NS
Eats foods that are slippery or "slimy" (ex. Fried egg, Jell-O)	2.71	3.03	NS

* P-value from Wilcoxon signed-rank test, statistical significance ($p<0.05$)

Table 6.4 Mean behavior event sampling counts exhibited during mealtimes by children classified as NON-PICKY based on VCode analysis of mealtimes obtained via video recording.

		BEHAVIOR						
Child #	**% Food items eaten†**	**Asked for seconds**	**Served seconds**	**Playing during meal**	**Distracted during meal**	**Negative reaction**	**Mixed Foods together**	**Tried unwanted food**
PS105	83.3	2	5.7	-	1	-	1	-
PS107	83.3	4.3	4	2.7	2.7	1	-	2
PS108	91.7	2	2	-	2	2	0.3	-
PS113	91.7	2	1.7	-	-	-	3	-
PS115	91.7	3	2	-	3.3	-	1.3	1
PS117	91.7	3	4	-	2	-	2	-
PS118	100	2.7	2	-	-	-	0.7	1
PS203	83.3	1	-	-	3.3	-	-	-
PS210	83.3	-	-	-	-	-	1.7	-
PS216	91.7	-	1	-	-	0.7	1	-
PS218	83.3	-	1	-	1	-	1	-
PS301	83.3	1	3.3	-	1	-	3.3	-
PS303	83.3	3	4	3	5	-	1.7	-
PS305	91.7	3.7	6.7	3	4	-	1	-
PS307	83.3	3	4	7	2	-	0.7	-
PS310	100	1	3	-	3.3	-	5.3	-
PS314	100	2	5.3	-	-	-	1	-
PS315	66.7	5	4.7	1	2	-	4	-
PS319	83.3	2.7	4	8.7	6	-	3.3	-
PS320	75	2	3.7	-	0.7	-	1	-

† *Indicates total % of foods tried across all meal observations*

Table 6.4 (cont.)

		BEHAVIOR						
Child #	**% Food items eaten†**	**Asked for seconds**	**Served seconds**	**Playing during meal**	**Distracted during meal**	**Negative reaction**	**Mixed Foods together**	**Tried unwanted food**
T103	100	4.3	8	2	0.7	-	3	-
T106	100	4	10.7	1	-	1	4.3	-
T107	100	2.7	5	0.7	1	-	1	-
T109	75	3	4.3	2	1	-	1	-
T111	87.5	3	4	1	-	-	-	1
T114	100	-	3	-	0.3	-	-	-
T202	100	7.7	8.7	13.3	1	0.7	3	-
T211	100	3	3	2	5.3	-	3.7	-
T212	100	2.7	4	9.3	-	-	3	-

† *Indicates total % of foods tried across all meal observations*

Table 6.5 Mean behavior event sampling counts exhibited during mealtimes by children classified as PICKY based on VCode analysis of mealtimes obtained via video recording.

		BEHAVIOR						
Child #	**% Food items eaten†**	**Asked for seconds**	**Served seconds**	**Playing during meal**	**Distracted during meal**	**Negative reaction**	**Mixed Foods together**	**Tried unwanted food**
PS207	50	-	-	5	4	-	1	-
PS209	58.3	2.7	1	5.3	8.3	-	-	-
PS316	50	-	3	7.7	6.3	-	-	-
T108	62.5	1	1	-	1.3	-	-	-
T204	58.3	-	2	-	-	-	-	-
T207	75	3.3	2	7.7	2	1	0.7	-

† *Indicates total % of foods tried across all meal observations*

Table 6.6 Comparison of children rated in observation as NON-PICKY with status according to parent and teacher survey picky (PE) and non-picky (NPE) ratings

	Parent Response	Status	Teacher Response	Teacher Status	Observation Status
Observation, Parent, and Teacher results: SAME					
PS108	2	NPE	1	NPE	NPE
PS118	2	NPE	1	NPE	NPE
PS303	2	NPE	1	NPE	NPE
PS320	1	NPE	2	NPE	NPE
T103	1	NPE	1	NPE	NPE
T109	2	NPE	1	NPE	NPE
T114	2	NPE	1	NPE	NPE
T212	2	NPE	2	NPE	NPE
Observation and Teacher results: SAME					
PS105	3	PE	1	NPE	NPE
PS115	3	PE	2	NPE	NPE
PS117	3	PE	1	NPE	NPE
PS203	3	PE	2	NPE	NPE
PS216	3	PE	2	NPE	NPE
PS301	3	PE	1	NPE	NPE
PS305	3	PE	1	NPE	NPE
T106	3	PE	1	NPE	NPE
T107	3	PE	1	NPE	NPE
T202	3	PE	1	NPE	NPE
T211	3	PE	2	NPE	NPE
Observation and Parents results: SAME					
PS113	2	NPE	3	PE	NPE
PS210	2	NPE	3	PE	NPE
PS218	2	NPE	3	PE	NPE
T111	1	NPE	3	PE	NPE
Observation, Parent, and Teacher results: DIFFERENT					
PS107	5	PE	3	PE	NPE
PS307	3	PE	3	PE	NPE
PS310	5	PE	3	PE	NPE
PS314	3	PE	3	PE	NPE
PS315	3	PE	3	PE	NPE

Table 6.7 Comparison of children rated in observation as PICKY with status according to parent and teacher survey picky (PE) and non-picky (NPE) ratings

	Parent Response	Status	Teacher Response	Teacher Status	Observation Status
Observation, Parent, and Teacher results: SAME					
T204	5	PE	5	PE	PE
T207	3	PE	4	PE	PE
Observation and Teacher results: SAME					
PS209	2	NPE	4	PE	PE
Observation and Parents results: SAME					
PS207	3	PE	1	NPE	PE
PS316	3	PE	2	NPE	PE
T108	4	PE	2	NPE	PE

CHAPTER 7
Summary and Future Directions

7.1 Summary

Prior to this research, it was already understood that parents play an influential role in the development of their child's food preference. However, there had been no direct investigation into the connection between various parenting styles and picky eating behaviors. Through exploring the relationship between parenting styles, feeding strategies, and child mealtime behaviors, we were able to establish preliminary findings regarding parent-child interactions and how they impact pickiness in toddlers. Additionally, our findings indicated that environment affects food preferences and child behaviors can change from one environment to another.

Initially we were interested in the impact of food availability in the home and whether that played a role in dietary variety consumed by picky eaters (PE) and non-picky eaters (NPE). Results showed that food availability was not a factor in the intake of picky eaters. Instead, we found that parents of PE reportedly served a similar variety of foods as parents of NPE; therefore, more factors play a part in what picky children choose to eat.

The overall purpose of our work then shifted towards parents in particular and how they impact child feeding. A series of focus groups were conducted with parents of 2-5 year olds to assess parental perceptions and attitudes about picky eating in toddlers and variations that occur across different parenting styles. Overlapping similarities were found in how parents perceive the definition of picky eating and there was agreement that environment, genetics, peers, and parenting are all factors in picky eating development. However, there were differences among how parents within the authoritative, authoritarian, and permissive parenting styles approach mealtime. Authoritative parents reported the greatest prevalence of NPE and discussed being focused on providing a positive, encouraging mealtime environment that promotes child

autonomy. In contrast, authoritarian and permissive parents reported having more PE. Authoritarian parents did not mention using positivity, patience, or parent modeling during meals. Additionally, along with permissive parents, they discussed using the negative strategy of rewards while feeding their child. This qualitative study created a foundation for the following projects because it provided insight into differences between parenting styles in the context of feeding.

From the focus group results, we were able to further confirm the relationships between PE and NPE children with parenting styles through a series of parent surveys. Parents completed questionnaires about their parenting style and the frequency of their own and their child's mealtime behaviors. Through a correlation analysis, we observed the trend between parenting styles and mealtime interactions. Authoritative parenting was positively correlated to strategies that promote good eating habits such as teaching their child about the food, modeling proper intake, using encouragement, and balancing parent-child control during feeding. The impact of these strategies was evident by the positive correlation between authoritative parenting and behaviors associated with NPE. Conversely, authoritarian and permissive parenting styles were positively correlated to strategies that can be harmful to child behaviors, in addition to being positively correlated to behaviors associated with picky eaters. To our knowledge, this was the first established relationship between authoritative parenting and NPE, as well as authoritarian and permissive parenting and PE; therefore, our results suggest that parents should utilize authoritative strategies at the table in order to foster healthy eating habits.

Taking this relationship a step further, we evaluated the connection between subjective parent and teacher opinions about a child's behavior and objective researcher observations in the Toddler Mealtime Behavior Study (TMBS). Part of the study included parent surveys which

resulted in similar correlations between parenting style, parent mealtime strategies, and child behaviors described above. Teachers who see the children in a daycare/preschool setting also completed a survey about child behaviors. When compared to parents we found that teachers experience fewer picky behaviors in the school environment than what parents reported from home. This finding is novel in suggesting that child mealtime behavior changes between different environments.

Additionally in the TMBS, we were able to watch preschoolers in their natural mealtime setting and categorize them as PE and NPE based on consumption variety and behaviors at the table. Once dichotomized, our objective assignments were compared to parent and teachers perceptions of each child's picky eating status. There was not a distinct trend between the alignment of researchers', parents', and teachers' assessments of PE and NPE children. Instead, there was variation in the assignment for 25 out of 35 children. These results highlight the difficulty in fully labeling a child as picky or non-picky and indicate that it may not be possible to divide children into two categories. Also, there is not a distinction within the literature between picky eating, non-food related mealtime problems, and general behavior challenges; therefore, it is complex to separate out only behaviors that designate a child as picky or non-picky. Taken together, these data suggest that perceptions of PE status are fluid and are influenced by parenting style and environment.

7.2 Future Directions

Although a relationship has been proven between parenting styles and picky eating, there are many unanswered questions that lend themselves to future research to expand upon these results. First of all, it is necessary to go into the home and confirm parental accounts of

mealtime strategies and child mealtime behaviors. Parent responses are somewhat subjective and conducting mealtime observations within the home would support parent-child interactions that are reported on surveys. Also, being able to see mealtimes within the home first hand would allow researchers to fully examine how the different parenting styles approach feeding. Many of the strategies in the Mealtime Assessment Survey could be construed as positive or negative depending on the context and method of delivery used by parents. Furthermore, in-home observations would create a comparison for the school-based observations. We saw a difference in survey results between parents' and teachers' perceptions of picky behaviors and the next step would be for researchers to objectively substantiate this difference.

In addition to verifying the prevalence of parent and child behaviors during meals, additional research is needed to test the effectiveness of parent mealtime strategies in the home. In our study, authoritative parenting was associated with positive strategies and non-picky behaviors in toddlers. It is unknown whether authoritarian and permissive parents can successfully employ authoritative strategies during meals to promote healthy, independent eating in their own children. This work would also need to be conducted in an observational setting whether it is in a home environment or in an artificial home setting where families could be watched during a meal.

Finally, further work is needed to explore the separation of picky eating, non-food related mealtime challenges, and general behavioral problems children may bring to the table. We were objective in our measurement of picky eating basing our categorization of children first on their consumption variety and then accounted for their behavior; however, parents may be experiencing a multitude of issues that lead them to label their child as picky. There is no

division within these possible difficulties during feeding which could create added confusion as to how picky eating is defined and measured in future research.

CHAPTER 8
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APPENDIX A

List of Food Items from the Food Inventory Survey

For each food item, the parent would check the appropriate box if:

- ***Food item is NOT served in parent's household now***
- ***Parent's child does NOT eat food item now***

100% Orange Juice	Pear	Zucchini, yellow squash	Peanut Butter
100% Apple Juice	Apricot	F. Fries, Tater Tots	Peanuts or other nuts
100% Grape Juice	Avocado	Potatoes (baked, mashed)	Baked or Chili Beans
Banana	Fruit cocktail, mixed fruit	Sweet potatoes or yams	Peas
Peaches	100% Tomato Juice	Cabbage, coleslaw	Refried Beans
Orange	Corn	Cauliflower	Black or White/Northern Beans
Grapefruit	Tomatoes, Raw	Lettuce salad	Rice
Apple	Tomato sauce or salsa	Celery	Oatmeal
Grapes	Peppers (green, red, hot)	Asparagus	Cream of Wheat
Strawberries	Carrots	Onion	Grits
Watermelon	Broccoli	Mushrooms	Bread, white
Cantaloupe / Melon	Green Beans	Mixed Vegetables	Bread, whole wheat or grain
Pineapple	Spinach	Beets	Tortilla
Kiwi	Greens (mustard, turnip, kale)	Lima Beans	Crackers
Plums	Okra	Chick Peas or Hummus	Cold Cereal, bran or crisp rice
Raisins or prunes	Squash, Orange or winter	Lintels	Cold Cereal, sweetened
Granola or Granola bars	Chicken, breaded , fried, nugget	Margarine	Pediasure or similar product
Biscuits	Chicken, grilled breast or strips	Olive Oil	Other type of supplement

Waffles or pancakes	Chicken, deli chicken	Salad dressing, Italian	Multivitamin or Multimineral supplement
Spaghetti or other pasta	Hotdog	Salad dressing, Ranch	Vitamin B supplement
Popcorn	Tuna	Mayonnaise	Vitamin C supplement
Muffin	Fish sticks or patty	Coffee or tea	Fish Oil
Milk, whole	Liver, organ meats	Soda, soft drink, pop (regular)	Iron supplement
Milk, 2%	Shrimp, other shellfish	Soda, soft drink, pop (sugar free)	Calcium supplement
Milk, 1%	Baked Fish	Fruit drinks (Hi-C, lemonade)	
Milk, skim	Eggs, scrambled	Chips	
Hot Chocolate or Choc Milk	Eggs, hard boiled	Cookies or brownies	
Cheese, natural cheddar, Swiss	Eggs, fried	Cake or cupcake	
Cheese, American processed	Tacos or burritos	Pie	
Cream Cheese	Pizza	Jell-O	
Cottage Cheese	Spaghetti with tomato meat sauce	Candy (not chocolate)	
Yogurt	Beef and vegetable stew or soup	Chocolate or candy bar	
Butter	Macaroni and cheese	Syrup	
Beef, ground/hamburger	Chicken pot pie	Honey	
Beef, steak or roast	Casserole	Ice Cream	
Beef, deli roast beef	Meat with potatoes and gravy	Pudding	
Pork, bacon or sausage	Stuffed green peppers	Jelly	
Pork, roast, loin or chop	Happy Meal or similar		
Pork, deli ham			
Turkey, breast or leg			

APPENDIX B

Parenting Styles and Dimensions Questionnaire

Instructions:

The following is a list of behaviors that parents may exhibit when interacting with their children. Please respond to items by rating how often you exhibit this behavior with your child. All responses will be kept confidential.

Ratings:
Never
Once in a while
About half of the time
Very often
Always

___ 1. I am responsive to my child's feelings and needs.
___ 2. I use physical punishment as a way of disciplining my child.
___ 3. I take my child's desires into account before asking the child to do something.
___ 4. When my child asks why he/she has to conform I state: because I said so, or I am your parent and I want you too.
___ 5. I explain to my child how I feel about the child's good and bad behavior.
___ 6. I spank when my child is disobedient.
___ 7. I encourage my child to talk about his/her troubles.
___ 8. I find it difficult to discipline my child.
___ 9. I encourage my child to freely express himself/herself even when disagreeing with parents.
___ 10. I punish by taking privileges away from my child with little if any explanations.
___ 11. I emphasize the reasons for rules.
___ 12. I give comfort and understanding when my child is upset.
___ 13. I yell or shout when my child misbehaves.
___ 14. I give praise when my child is good.
___ 15. I give into my child when the child causes a commotion about something.
___ 16. I explode in anger towards my child.
___ 17. I threaten my child with punishment more often than actually giving it.
___ 18. I take into account my child's preferences in making plans for the family.

APPENDIX B

___ 19. I grab my child when being disobedient.

___ 20. I state punishments to my child and do not actually mean them.

___ 21. I show respect for my child's opinions by encouraging my child to express them.

___ 22. I allow my child to give input into family rules.

___ 23. I scold and criticize to make my child improve.

___ 24. I spoil my child.

___ 25. I give my child reasons why rules should be obeyed.

___ 26. I use threats as punishment with little or no justification.

___ 27. I have warm and intimate times together with my child.

___ 28. I punish by putting my child off somewhere alone with little if any explanations.

___ 29. I help my child to understand the impact of behavior by encouraging them to talk about the consequences of their own actions.

___ 30. I scold or criticize when my child's behavior doesn't meet my expectations.

___ 31. I explain the consequences of the child's behavior.

___ 32. I slap my child when the child misbehaves.

APPENDIX C

Online Parent Consent Form for Parenting Styles Focus Groups

Picky Eating and Parenting

You are invited to participate in a study involving discussion of the characteristics that describe a picky eater and what strategies parents use to overcome picky eating problems. The purpose of this research is to investigate parental perceptions of picky eating. This survey will assess your parenting style and the results will be used only to schedule your participation in the focus groups. Parents will be assigned to focus groups with others who have a similar parenting style. This study is conducted by Dr. Soo-Yeun Lee and Dr. Sharon Donovoan of the Department of Food Science and Human Nutrition with assistance from graduate researcher Amy MacInnes, all from the University of Illinois Urbana Champaign.

This survey will take no longer than 30 minutes of your time. You will be shown a series of 32 behaviors that parents may exhibit when interacting with their children. You will then rate on a scale how often you exhibit this behavior with your child (Never, Once in a while, About half the time, Very often, Always). At the end of the survey, you will be asked to provide contact information for the scheduling of the focus groups. Either an email address or phone number must be provided in order to be scheduled for participation. You will also be asked about your availability to take part in one 1.5 hour focus group. After completing the online survey and participating in one focus group, you will receive $25 for your time.

Your decision to participate or decline participation in this study is completely voluntary and you have the right to terminate your participation at any time without penalty. If you do not wish to complete this survey just close your browser. Your decision to participate, decline, or withdraw from participation will have no effect on your current status or future relations with the University of Illinois.

Your participation in this research will be completely confidential. Your name and contact information will be kept confidential and will be used only for the purpose of scheduling the focus groups. Participants' personal information will NOT be released in any way. If results are used beyond the scheduling of the focus groups, all data will be averaged and reported in aggregate. Possible outlets of dissemination may be a thesis paper, journal article and possible conference presentation. Results may also be shared internally with the sponsoring agency, but individual participant names and information will NOT be shared. Although your participation in this research may not benefit you personally, it will help us understand the influences that lead to picky eating in children so we can assist parents in overcoming picky eating difficulties.

There are no risks to individuals participating in this survey beyond those that exist in daily life and the use of the internet.

If you have questions about this project, you may contact research assistant Amy MacInnes at 217-333-9795 or pickyeating.uiuc@gmail.com. You may also contact the principle investigator Dr. Soo Lee at 217-244-9435 or soolee@uiuc.edu. If you have any questions about your rights as a research participant in the study, please contact the University of Illinois Institutional Review Board at 217-333-2670 (collect calls accepted if you identify yourself as a research participant) or via email at irb@illinois.edu.

Please print a copy of this consent form for your records, if you so desire.

I have read and understand the above consent form, I certify that I am 18 years or older, and by clicking "next" to enter the survey, I indicate my willingness to voluntarily take part in the study.

APPENDIX D

Hard-Copy Parent Consent Form for Parenting Styles Focus Groups

You are invited to participate in a study involving discussion of the characteristics that describe a picky eater and what strategies parents use to overcome picky eating problems. The purpose of this research is to investigate parental perceptions of picky eating. You will be a in a group of 7-8 people discussing picky eating-related topics. There are no right or wrong answers. At the end of the focus group, you will be asked to complete a short demographic questionnaire, but you may skip any questions that you do not wish to answer. There are no risks to you beyond those of everyday life. You are free to withdraw from the study at any time for any reason. We also reserve the right to terminate your participation at any time for any reason, including arriving late or inability to follow directions. The decision to participate, decline, or withdraw from participation will have no effect on your status at or future relations with the University of Illinois.

The study will be conducted at Bevier Hall Room # 376 (Sensory lab). You have already taken the online questionnaire which took about 30 minutes. Participation in this focus group will take about 1.5 hours. Taking part in the study is voluntary, and you will be compensated $25 for your participation.

Being audio and video recorded during the focus group sessions is a requirement of participation, but the recordings themselves will be transcribed and the recordings themselves won't be disseminated. Responses collected from the focus group are coded and codes are not linked to the panelists' names. Results from this research will be disseminated in the form of thesis paper, report to research sponsor, journal article, and conference presentation. Any publications or presentations of the results of the research will not be linked back to any individual participant and will only include information about group performance. However, the researchers cannot guarantee that the other participants will not share responses outside the session.

Benefits of this research to society will be a good understanding of the U.S. parents' perceptions of picky eating, as well as what actions parents take to encourage child feeding.

You are encouraged to ask any questions that you might have about this study whether before, during, or after your participation. Concerns or questions can be addressed to Dr. Soo-Yeun Lee (217-244-9435, soolee@uiuc.edu) or Amy MacInnes (217-333-9795, macinne2@illinois.edu). You may also contact the University of Illinois Institutional Review Board Office (217-333-2670, irb@illinois.edu) for any question about the rights of research subjects. If you live outside the local calling area, you may also call collect.

____ I understand that the researchers will use **both audio and video** recording during my session and that being recorded is a requirement of my participation.

By signing below, I certify that I am at least 18 years in age and I understand the information and voluntarily consent to participate in the study described above. I have been given a copy of this consent form.

Signature _____ Date _____

Printed Name _____

APPENDIX E

Demographic Questions Asked During the Parenting Styles Focus Groups

Q1: Please tell us your gender

Male
Female
I prefer not to say

Q2: Which of the following best describes your age?

Under 18 years old
18 - 25
26 - 35
36 - 45
46 - 55
56 - 65
66 and over
I prefer not to say

Q3: What is your marital status?

Single
Married
I prefer not to say

Q4: How do you describe yourself? (Mixed race heritage should check all that apply)

African American
American Indian or Alaska Native
Asian
Caucasian
Hispanic or Latino
Native Hawaiian or Other Pacific Islander
There is no applicable answer
I prefer not to say

APPENDIX E

Q5. Which of the following best describes the number of your children and their ages?

I have one child or more than one child, and most of them are below 7 years old

I have one child or more than one child, and most of them are above 8 and below 18 years

I have one child or more than one child, and most of them are above 19 years old. They live at my home

I have one child or more than one child, and most of them are above 19 years old. However, they do not live at my home for school, job, marriage, etc

There is no answer applicable

I prefer not to say

Q6: What is your highest level of education?

Some high school

High school graduate

Technical school

Some college

Bachelors degree (4 year college)

Post graduate degree (Masters or Doctorate)

I prefer not to say

Q7: Are you a faculty, student, or staff of the University of Illinois? If yes, then which group do you belong to?

Faculty

Student

Staff

No, I am not related to the University of Illinois

Q8. Which of the following best describes your household's total yearly income before taxes?

Under $25,000

$25,000 - $34,999

$50,000 - $74,999

$75,000 - $99,999

$100,000 and over

I prefer not to say

APPENDIX F

Online Parent Consent Form for Parent MAS Survey and PSDQ Survey in Chapter 5

Child Mealtime Behavior and Parenting Style Survey

You are invited to participate in a research study regarding mealtime behaviors and parenting style. The purpose of this research is to better understand the behaviors of picky and non-picky eaters. This study is conducted through Innovative Consumer Research by Dr. Soo-Yeun Lee and Dr. Sharon Donovan of the Department of Food Science and Human Nutrition with assistance from graduate researcher Amy Maclnnes and undergraduate student Marisa Mozer, all from the University of Illinois Champaign-Urbana.

Completing both of the surveys will take approximately 30 minutes of your time. You will be asked to first rate the frequency with which your child exhibits 43 mealtime behaviors using a 5-point scale (1=never to 5=always). Then you will be presented with a list of 25 mealtime strategies and be asked which ones you use to get your child to eat at mealtime. The final section includes a series of 32 behaviors parents may exhibit when interacting with their child. You will then rate on the same 5 point scale how often you exhibit this behavior with your child. After completing the online survey, you will have an opportunity to provide your Innovative Consumer Research panelist ID number in order to be entered in the drawing for monetary prizes. It is completely voluntary to provide your ID number and is not a requirement for participation; however, it is required to provide this number if you want to be eligible for winning a gift card.

Your decision to participate or decline participation in this study is completely voluntary and you have the right to terminate your participation at any time without penalty. You may skip any questions you do not wish to answer. If you want do not wish to complete this survey just close your browser. Your answers will not be saved and if you decide to re-take the survey after leaving, you must start over.

Your participation in this research will be completely confidential and all data will be averaged and reported in aggregate. Participants' personal information will NOT be released in any way. Possible outlets of dissemination may be a thesis paper, journal article, and possible conference presentation. Results may also be shared internally with the sponsoring agency, but individual participant names and information will NOT be linked to survey responses. Innovative Consumer Research will know panelist name's linked to their ID numbers; however, they will not know which survey responses are linked to those ID numbers and names. Although your participation in this research may not benefit you personally, it will help us understand the role that parents play in contributing to picky and non-picky eating behaviors.

There are no risks to individuals participating in this survey beyond those that exist in daily life and the use of the internet. IP addresses associated with those taking the survey will NOT be saved or shared with any third party.

APPENDIX F

If you have questions about this project, you may contact undergraduate student Marisa Mozer at 847-840-1651 or research assistant Amy Maclnnes at 217-333-9795 (email child.mealtime.uiuc@gmail.com). You may also contact the principle investigator Dr. Soo-Yeun Lee at 217-244-9435 or soolee@uiuc.edu. If you have any questions about your rights as a research participant in the study, please contact the University of Illinois Institutional Review Board at 217-333-2670 (collect calls accepted if you identify yourself as a research participant) or via email at irb@illinois.edu.

Please print a copy of this consent form for your records, if you so desire.

I have read and understand the above consent form, I certify that I am 18 years old or older and, by clicking the submit button to enter the survey, I indicate my willingness to voluntarily take part in the study.

APPENDIX G

Demographic Questions Asked During the Parent Surveys

Q1: Please tell us your gender

Male
Female
I prefer not to say

Q2: Which of the following best describes your age?

Under 18 years old
18 - 25
26 - 35
36 - 45
46 - 55
56 - 65
66 and over
I prefer not to say

Q3: What is your marital status?

Single
Married
I prefer not to say

Q4: How do you describe yourself? (Mixed race heritage should check all that apply)

African American
American Indian or Alaska Native
Asian
Caucasian
Hispanic or Latino
Native Hawaiian or Other Pacific Islander
There is no applicable answer
I prefer not to say

Q5. How many children do you have? _____

Q6. List ages of children (separate with commas) _____

APPENDIX H

Parent Mealtime Assessment Survey (MAS)

Child Mealtime Behaviors

Instructions: Please respond to the statements below by checking how often each of the statements describes ***your child now***.

	Characteristic	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
1	Goes for long periods of time without thinking about eating or saying "I'm hungry"					
2	Puts up a fight or refuse to come to the table when it is time for a meal					
3	Shows signs of fear, nervousness, or strong anxiety before mealtime					
4	Goes in and out of kitchen and questions about the meal being prepared					
5	Looks forward to eating and mealtime					
6	Cringes or make a negative face after seeing or eating certain foods					
7	Cries of gets upset after seeing or eating certain foods					
8	Gags or has physical reaction after seeing or eating certain foods (NOT related to food allergies)					
9	Is disengaged/uninvolved while sitting at the table during mealtime					
10	Carefully inspects majority of food before taking a bite (is suspicious of food)					
11	Has something better to do than eating at mealtime					
12	Shows signs of sadness or disappointment when food is not prepared/cooked in the "right way"					
13	Needs to eat with special utensils/dishes					
14	Eats foods in sequence during the main course (ex: all peas first, then all potatoes, etc)					

APPENDIX H

15	Takes a long time to finish a meal compared to the rest of the family					
16	Finishes all the food served on the plate					
17	Refuses to open mouth when they do not want to eat certain foods					
18	Would rather drink liquids instead of eat the food at mealtime					
19	Needs a specific food presentation or the preparation of the food must be exactly right					
20	Tries new foods					
21	Eats the same foods repeatedly					
22	Eats from a narrow range of food (fewer than 10 different foods)					
23	Eats foods from only one food group (ex: eats only from meat group, grains group, etc)					
24	Eats the same meal for breakfast					
25	Eats the same meal for lunch					
26	Eats the same meal for dinner					
27	Eats foods that are considered “healthy”					
28	Eats leftovers					
29	Eats foods with something in them that cannot be seen (ex: filled foods like eggrolls, ravioli)					
30	Eats foods that have touched each other on the plate					
31	Eats foods that are mixed or that have complex ingredients (ex: casseroles, lasagna)					
32	Eats foods with sauces on them (ex: pasta with tomato sauce, turkey with gravy)					

APPENDIX H

33	Eats uncooked foods that are normally served raw (ex: raw veggies, fruits)					
34	Eats salty foods					
35	Eats sour foods					
36	Eats sweet foods					
37	Eats bitter foods (even if they are just slightly bitter)					
38	Eats foods that are “lumpy” (ex: sauce with pieces in it or stew)					
39	Eats foods that are slippery or “slimy”					
40	Eats foods that are hard, dry or crunchy					
41	Eats foods that are smooth or pureed food with no detectable particulates					
42	Eats foods of only one particular color					
43	Is a picky eater					

APPENDIX H

Parent Mealtime Strategies

Instructions: Do you use any of the following strategies to get your child to eat at mealtime? Please indicate how often you use each strategy.

	Strategy	**Never (never used ever)**	**Rarely (used a few times ever)**	**Sometimes (1-2 times a month)**	**Often (1-2 times a week)**	**Always (everyday)**
1	Offer your child a favorite food, snack or sweet/dessert as a reward for eating.					
2	Offer your child a non-food reward for eating food served at a meal (for example "if you eat your chicken and you can watch TV after dinner").					
3	Arrange the food in an interesting way to make the meal fun (for example, making the food on the plate look like a smiley face).					
4	Teach your child about the food served at the meal.					
5	Require your child to try a bite of each food on their plate.					
6	Reason with your child to get them to eat (for example, carrots are good for you because they help your eyes).					
7	Show disapproval if your child does not eat.					
8	Allow your child to choose the foods they want to eat from the food that is served.					
9	Praise your child about their food intake or feeding skills.					
10	Tell your child they cannot leave the table until a food is eaten (for example, "you must eat a bite of green beans before being excused").					
11	Withhold a favorite food, snack or sweet/dessert as a consequence for not eating.					
12	Withhold something other than food as a consequence for not eating (for example, "if you don't eat your casserole, you can't go outside after dinner").					

APPENDIX H

13	Tell your child that the food tastes good.					
14	Spoon-feed your child to get them to eat.					
15	Assist your child in preparing to eat (for example, cutting meat into smaller pieces).					
16	Involve your child in planning and preparing the meal.					
17	Encourage your child to try new foods.					
18	Make your child finish all of the meal before getting dessert.					
19	Make a different food for your child before the meal if they don't like what is being served. (for example, the family is eating casserole and the child eats macaroni & cheese)					
20	Make a different food for your child after the meal if they didn't eat the food that was served.					
21	Serve a combination of foods that are new and/or disliked with foods already preferred by your child.					
22	Allow your child to eat what and how much they want at the majority of meals.					
23	Make the meal into a game to encourage eating .					
24	Model to your child that Mom and/or Dad are eating the food so they should eat the food too.					
25	Do not need to use any strategies to get my child to eat at mealtime.					

APPENDIX I

Hard-Copy Parent Consent Form for the Toddler Mealtime Behavior Study

Dear Parent:

You are invited to participate in a study regarding mealtime behaviors in children ages 2-5 years old. This research project aims to explore both picky and non-picky eating behaviors that young children exhibit both at home and at school. The goal is to better understand the influence of parents and the environment on a child's dietary preferences in order to better help parents develop healthy independent eaters. This study is conducted by Dr. Soo-Yeun Lee and Dr. Sharon Donovan of the Department of Food Science and Human Nutrition with assistance from graduate researcher Amy MacInnes, all from the University of Illinois Urbana Champaign.

As a part of the study, one parent from each family will complete a set of surveys regarding their child's mealtime behaviors and general parenting style. Classroom teachers will also complete a mealtime behavior survey about each child in the study. Additionally, each child in the study will be observed in their normal lunchtime environment at the Child Development Laboratory during three mealtimes. Each observation will last for 15 minutes and there will be no alterations in the child's normal lunch routine. In order to document the mealtimes, observations will be conducted with video cameras. All collected data will kept confidential by researchers and stored securely in accordance with the University of Illinois's research guidelines. There are no risks to you and your child beyond those of everyday life and the daily practices at the Child Development Laboratory.

The parent surveys include the Mealtime Assessment Survey (MAS) and the Parenting Styles and Dimensions Questionnaire (PDSQ). The MAS will take approximately 20 minutes of your time. You will be shown a series of 50 child mealtime behaviors and 25 parental mealtime strategies and asked to rate on a scale (Never, Once in a while, About half the time, Very often, Always) how often you or your child exhibit these behaviors/strategies. The PSDQ will take approximately 10 minutes and you will be given a series of 32 behaviors parents may exhibit when interacting with their child. You will then rate on the same scale how often you exhibit this behavior with your child. By completing these two surveys and allowing your child to be a part of the mealtime observations, you will receive a $15 gift card to Meijer for your time.

Your decision to participate or decline participation in this study is completely voluntary and you have the right to terminate your participation at any time without penalty. Your decision to participate, decline, or withdraw from participation will have no effect on your current status or future relations with the University of Illinois or the Child Development Laboratory. Your child's participation in this project is completely voluntary. In addition to your permission, your child will also be asked if he or she would like to take part in this project. Only those children who have parental permission and who want to participate will do so, and any child may stop taking part at any time. You are free to withdraw your permission for your child's participation at any time and for any reason without penalty. These decisions will have no affect on your future relationship with the Child Development Laboratory or your child's status there.

You and your child's participation in this research will be completely confidential and will not become a part of your child's school record. Your name and contact information will be kept secure and only accessed by the CDL. Each participant will be given a number code which will be the only identification of participants that researchers will receive from the CDL. Participants' personal information will NOT be released in any way. The results of all data collection will be averaged and reported in aggregate. Possible outlets of dissemination may be a thesis paper, journal article and possible conference presentation. Results may also be shared internally with the sponsoring agency, but individual participant names and information will NOT be shared. Although your

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participation in this research may not benefit you personally, it will help us understand the influences that lead to picky eating in children so we can assist parents in overcoming picky eating difficulties.
If you have any questions about this project, please contact us using the information at the end of this consent form. If you have any questions about your rights as a participant in research involving human subjects, please feel free to contact the University of Illinois Institutional Review Board (IRB) Office at 217.333.2670 or irb@uiuc.edu. You are welcome to call these numbers collect if you identify yourself as a research participant.

Please keep the attached copy of this letter for your records.

Sincerely,

Amy MacInnes
217-333-9795
pickyeating.uiuc@gmail.com

Dr. Soo-Yeun Lee
217-244-9435
soolee@illinois.edu

Please check here if you consent:

____ I have read and understand the above consent form, I certify that I am 18 years or older, and I indicate my willingness to voluntarily take part in the study. I also give permission for my child _____ to participate in the research project described above.

By signing below, I certify that I am at least 18 years in age and I understand the information and voluntarily consent to participate in the study described above. I have been given a copy of this consent form.

Signature Date

Printed Name

APPENDIX J

Teacher Mealtime Assessment Survey (MAS)

Child Mealtime Behaviors

Instructions: Please respond to the statements below by checking how often each of the statements describes ***the child's behavior regarding classroom mealtimes.***

	Characteristic	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
1	Puts up a fight or refuse to come to the table when it is time for a meal(or snack)					
2	Shows signs of fear, nervousness, or strong anxiety before mealtime(or snack)					
3	Looks forward to eating and mealtime (or snack)					
4	Cringes or makes a negative face after seeing or eating certain foods					
5	Cries or gets upset after seeing or eating certain foods					
6	Gags or has a physical reaction after seeing or eating certain foods (NOT related to food allergies)					
7	Is disengaged/uninvolved while sitting at the table during mealtime (or snack)					
8	Carefully inspects majority of food before taking a bit (is suspicious of food)					
9	Has something better to do than eating at mealtime (or snack)					
10	Shows signs of sadness or disappointment when food is not prepared/cooked in the "right way"					
11	Eats foods in sequence during the main course (ex: all peas first, then all potatoes, etc)					
12	Takes a long time to finish a meal compared to everybody else					
13	Finishes all the food served on the plate					

APPENDIX J

14	Refuses to open mouth when do not want to eat certain foods					
15	Would rather drink liquids instead of eat the food at mealtime (or snack)					
16	Tries new foods					
17	Eats the same foods repeatedly					
18	Eat from a narrow range of food (fewer than 10 different foods)					
19	Eats foods from only one food group (ex: eats only from meat group, grains group, etc)					
20	Eats foods that are considered “healthy”					
21	Eats foods with something in them that cannot be seen (ex: filled foods like ravioli)					
22	Eats foods that have touched each other on the plate					
23	Eats foods that are mixed or that have complex ingredients (ex: casseroles, lasagna)					
24	Eats foods with sauces on them (ex: pasta with tomato sauce, turkey with gravy)					
25	Eats uncooked foods that are normally served raw (ex: raw veggies, fruits)					
26	Eats foods that are “lumpy” (ex: sauce with pieces in it or stew)					
27	Eats foods that are slippery or “slimy”					
28	Eats foods that are hard, dry or crunchy					
29	Eats foods that are smooth or pureed food with no detectable particulates					
30	Eats foods of only one particular color					
31	Is a picky eater					

APPENDIX K

Hard-Copy Teacher Consent Form for the Toddler Mealtime Behavior Study

You are invited to participate in a study regarding mealtime behaviors in children ages 2-5 years old. This research project aims to explore both picky and non-picky eating behaviors that young children exhibit both at home and at school. The goal is to better understand the influence of parents and the environment on a child's dietary preferences in order to better help parents develop healthy independent eaters. This study is conducted by Dr. Soo-Yeun Lee and Dr. Sharon Donovan of the Department of Food Science and Human Nutrition with assistance from graduate researcher Amy MacInnes, all from the University of Illinois Urbana Champaign.

As a part of the study, one parent from each family will complete a set of surveys regarding their child's mealtime behaviors and general parenting style. Teachers will also complete a survey about the child's mealtime behaviors while at school. Additionally, each child in the study will be observed in their normal lunchtime environment at the Child Development Laboratory during three mealtimes. Each observation will last for 15 minutes and there will be no alterations in the child's normal lunch routine. In order to document the mealtimes, observations will be conducted with video cameras. Since classroom teachers sit at the same table as the children during lunch, there is a chance that you will be recorded as well. All collected data will kept confidential by researchers and stored securely in accordance with the University of Illinois's research guidelines.

The survey you will complete is called the Mealtime Assessment Survey will take approximately 20 minutes of your time. You will be shown a series of 50 behaviors that may be exhibited by a child at mealtime. Please rate on a scale how often you see the child you are assessing exhibit each particular behavior (Never, Once in a while, About half the time, Very often, Always). Please refer to one child only each time you take the survey; however, you do not need to indicate which child you are referring to.

Your decision to participate or decline participation in this study is completely voluntary and you have the right to terminate your participation at any time without penalty. Your decision to participate, decline, or withdraw from participation will have no effect on your current status or future relations with the University of Illinois or the Child Development Laboratory.

Your participation in this research will be completely confidential. Your name and contact information will be kept secure and only accessed by the CDL and project researchers. Participants' personal information and the videos will NOT be released in any way. The results of all data collection will be averaged and reported in aggregate. Possible outlets of dissemination may be a thesis paper, journal article and possible conference presentation. Results may also be shared internally with the sponsoring agency, but individual participant names and information will NOT be shared. Although your participation in this research may not benefit you personally, it will help us understand the influences that lead to picky eating in children so we can assist parents in overcoming picky eating difficulties.

There are no risks to individuals participating in this survey beyond those that exist in daily life.

If you have any questions about this project, please contact us using the information at the end of this consent form. If you have any questions about your rights as a participant in research involving human subjects, please feel

free to contact the University of Illinois Institutional Review Board (IRB) Office at 217.333.2670 or irb@uiuc.edu. You are welcome to call collect if you identify yourself as a research participant.

Please keep the attached copy of this letter for your records.

APPENDIX K

Sincerely,

Amy MacInnes
217-333-9795
pickyeating.uiuc@gmail.com

Dr. Soo-Yeun Lee
217-244-9435
soolee@illinois.edu

Please check here if you consent:

____ I have read and understand the above consent form, I certify that I am 18 years or older, and I indicate my willingness to voluntarily take part in the study and complete the teacher surveys.

____ I agree to have my classroom observed and grant permission for researchers to capture me in the video footage with the understanding that the videos will not be disseminated.

By signing below, I certify that I am at least 18 years in age and I understand the information and voluntarily consent to participate in the study described above. I have been given a copy of this consent form.

Signature Date

Printed Name

APPENDIX L

Coded Behaviors in VCode for Video Analysis

MOMENTARY EVENTS
Served food (1 code per food item at meal)
Bite of food (1 code per food item at meal)
Ask for seconds
Served 2nds (1 code per food item at meal)
Make a negative face
Spits out food

RANGE EVENTS (occur over time)
Drinking milk
Playing
Ranged events over time:
Distracted
Cries or gets upset
Refuses to come to table

APPENDIX M

Qualitative Notes Page for Video Analysis

Child's name:	**Classroom/Video:**
Child's ID number:	**Did the child finish before 15 min? Yes/No**
Child description:	**End time:**

Day: **Meal:**

Did the ***child say "no"*** to any of the served foods? Which foods?

_____

Asking for seconds: did child have to try other food? How did they react? Provide details:

_____

Did any of the ***foods have sauce*** on them? Were they served to child?

_____

Can you see any of the ***foods touching*** each other? Which foods?

_____

Were any of the ***foods separated*** from each other ***by the child***?

_____

Were ***two foods consumed together***? Which foods?

_____

Did the child ***gag*** on any food? Which food?

_____

If child was ***playing***, describe what they did:

_____

If child was ***distracted***, describe what they did:

_____

If child made a ***negative face***, describe what they did and why:

_____

If they child ***cried/got upset***, describe what happened:

_____